April Volume 122 No. 4 50 Cents
1959
Pioneer Journal of the Industry

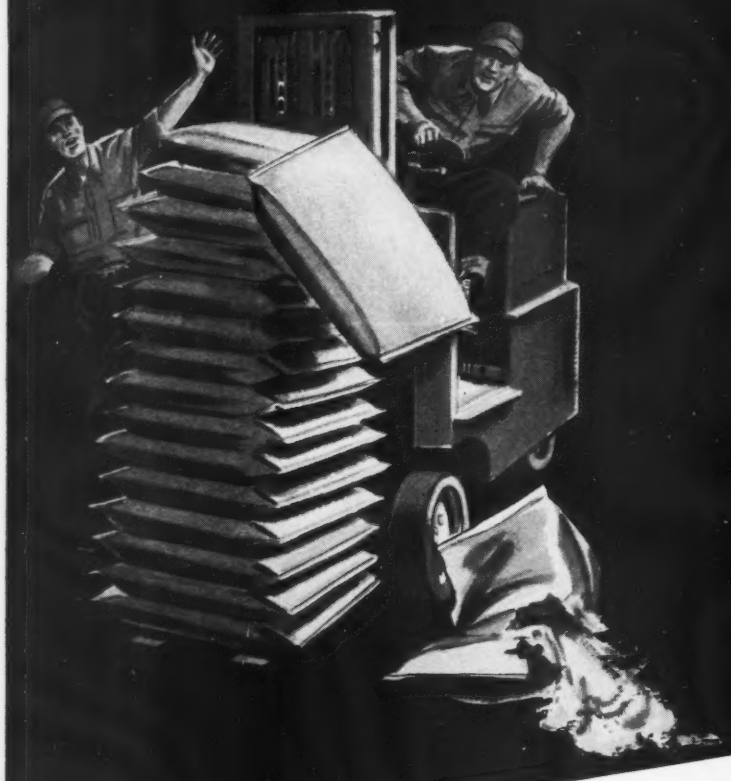
FARM CHEMICALS

Marketing liquid fertilizer through agronomic appeals

The best thing I ever did for my customers

Report on stored grain insect control

Fair Exhibit Tips



WHY LET YOUR MONEY SLIP AWAY?

Hudson's Super-Magnetized
Multiwalls
Cut Slippage
Prevent Breakage

FIELD REPORT

TO: B.D.

RE: How Super-Magnetized Cut Claims for [redacted].

Because his is an expensive product, Mr. [redacted] insists on maximum protection for his shipments. Losses through sack breakage due to slipping had become something of a phobia with him. Since he switched to our Super-Magnetized Multiwalls he has not had a single claim arising from slippage.

Actual cash savings have far and away absorbed our upcharge for these bags. He also reports an improvement in customer good will.

Hudson Bags increase your sales — cut your costs!

HUDSON MULTIWALLS

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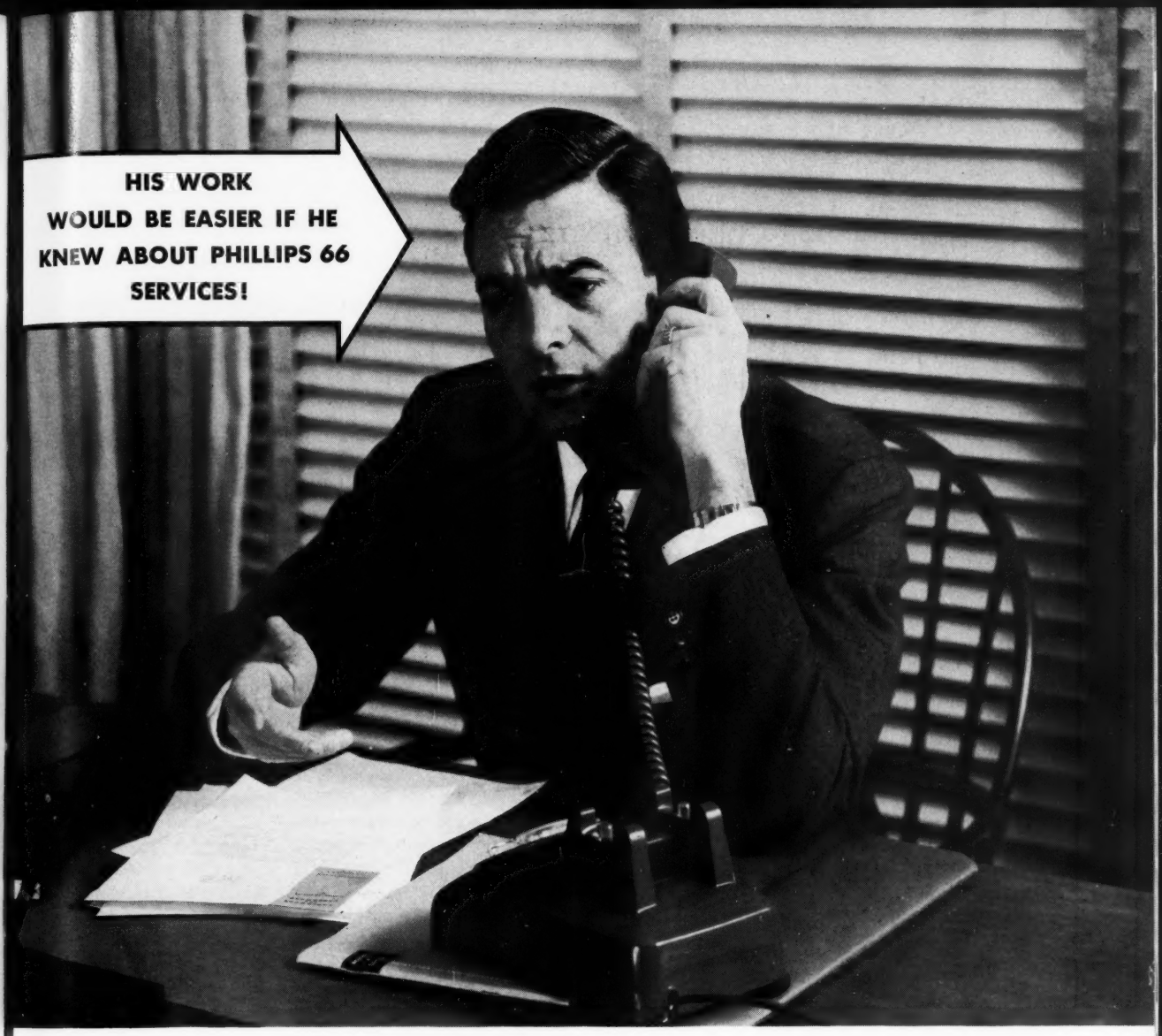

You can depend on Phillips *66* Service and Fertilizer Products

Phillips 66

"Good Name to Mix With"

The harassed executive in the picture above will find his job easier and more profitable . . . if he depends on all the services and products of Phillips *66*.

He'd find, in fact, that technical services and sales services are one with Phillips *66*. The main purpose being: to help mixers make more profit. Mixers can rely, too, on punctual delivery of Phillips *66* materials —Nitrogen Solutions, Anhydrous Ammonia, Ammonium Nitrate, Ammonium Sulfate, Triple Superphosphate. Got a production or sales problem? For prompt attention . . . call, write or wire.

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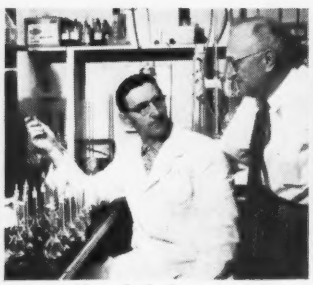
Together with phosphate products...

Cyanamid supplies the kind of service you can use

Cyanamid mines phosphate rock and manufactures triple superphosphate and phosphoric acid. That's our business. Since 1905, supplying mixers and manufacturers has been our *only* fertilizer business. Because we know fertilizers, we're in a position to contribute in special ways to *your* products. For example, our people are ready...and able...to help integrate Cyanamid phosphate products into your operation, and to help you get more out of your plant than ever before. Their training in fertilizer manufacture includes experience in hundreds of plants using many different processes. Long experience also enables us to route shipments from our Florida Plant for quickest delivery, whenever you desire this service. And, Cyanamid specialists are ready to serve you *wherever* you are located. Simply call, wire or write. These pictures show one of these specialists contributing his experience to some of our customers. American Cyanamid Company, Phosphates and Nitrogen Department, N.Y. 20, N.Y.

Here's where Cyanamid service pays off...in better mixed fertilizers. This run, inspected by a Cyanamid representative, was made with TREBO-PHOS triple superphosphate. Grade and uniformity: excellent.

Formulas are usually discussed in the office, but Cyanamid technical service people are adaptable, work where you work. Their experience has been developed in many plants. Often, what are new problems to you are solved-problems to them.



Cyanamid technical representatives are trained in all phases of fertilizer manufacture. They can follow your process through from our delivery to yours. Here the Cyanamid man checks with chemist analyzing samples of mixed fertilizer before bagging.

Cyanamid traffic experts are perienced at routing phosp shipments to eliminate avoi delays, cut demurrage, keep plant humming along on sche

To manufacture fertilizers that sell mix

onstant checking of equipment assures peak efficiency. Cyanamid technical
ervice man interprets meter reading. He often can suggest changes in procedure
at result in better mixed goods, produced more economically.

t sel mix with Cyanamid's Phosphates and Service

TREBO-PHOS* TRIPLE SUPERPHOSPHATE
PHOSPHATE ROCK | PHOSPHORIC ACID

*Trademark

CYANAMID
PHOSPHATE PRODUCTS

FARM CHEMICALS

Vol. 122 No. 4 April 1959

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MEMBER BUSINESS PUBLICATIONS AUDIT

The national business magazine for the fertilizer and pesticide industries, FARM CHEMICALS, serves primarily those persons responsible for management, marketing and production. It has a qualified circulation for selected executive and supervisory persons within specified segments of these industries, as well as in certain closely allied fields. Subscription rates to all others are: in the U.S., its possessions, Canada, Cuba and Panama: $6.00; in other countries: $7.50. Single copy 50 cents. Established in 1894 as *The American Fertilizer*.

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MARKETING

16 Complete Liquids: Increase and Uncertainty
Peter C. Crolius

22 Help Your Farmers Obtain More Credit for Fertilizer

25 "The Best Thing I Ever Did for My Farm Customers"
Harry E. Rash

MERCHANDISING AIDS AND PROMOTION

28 It's Time to Start Planning Your Fair Exhibit

MATERIALS HANDLING AND CUSTOM APPLICATION

40 Specialized Equipment for the Dry Bulk Industry

TECHNICAL REVIEW

42 Pesticide Research

PRODUCTION METHODS

61 Developments in Superphosphate Production
A. V. Slack

special reports

30 Pesticide Problems

44 Stored Grain Insect Control

DEPARTMENTS

6 Letters

8 Washington Viewpoint

14 What's Doing in the Industry

37 Reader Service

47 News of the Industry

49 Associations and Meetings

54 People

58 Calendar

58 Chemicals

58 Equipment and Supplies

60 Patent Reviews *Dr. Melvin Nord*

66 Pest Reports *Kelvin Dorward*

68 Editorial: The Foundation is There—Let's Start Building

THE COVER PICTURE

Edwin Aylward (left) and his brother Arthur, "opportunity-makers" in the complete liquid fertilizer field, discuss a fertilizer order. First with complete liquid fertilizer in the central mid-west, their story is on page 16, along with a report of the industry's "increase and uncertainty" problems.

Farm Chemicals Photo by Harry W. Ransdell

TIME AFTER TIME . . . by the millions and millions

Uniform quality is the mainspring in manufacturing Chase bags—for we realize you expect *every* bag to *safely* carry your product to market. Up-to-the-minute methods for quality control . . . time-tested techniques in selecting the right paper or other material for maximum strength, minimum bulk . . . a material that's also right for printing, handling . . . these are just a few of the reasons users *know* they can rely on Chase bags—time after time.

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—A NATIONWIDE STAFF OF BAG SPECIALISTS

LETTERS

HANDLING GRANULAR GOODS

New York, N. Y.

We read with interest your very timely article in the January issue of FARM CHEMICALS entitled "What Farmers are Saying About Bulk, Liquid and Bagged Fertilizers." However, we note that you treat only bagged, bulk blend and liquid fertilizers with no reference to ammoniated and/or granulated mixed fertilizers handled in bulk. This important and fast growing segment of the fertilizer distribution system should not be overlooked.

An increasing number of progressive mixed fertilizer ammoniators and granulators are placing heavy emphasis on bulk movement. Their high quality homogenous products can be handled readily in bulk and are being applied not only thru spreader trucks but thru farmer owned broadcast spreaders and starter fertilizer attachments as well. Handling these products in bulk thru suitable equipment offers convenience and cost advantages equal to those attributed to other types of bulk fertilizer.

Very truly yours,
G. C. MATTHIESEN
Assistant to Manager
Fertilizer Mfg. Materials
NITROGEN DIVISION
ALLIED CHEMICAL CORP.

We asked Thomas E. Clague, author of the article, to answer Mr. Matthiesen's letter. The answer follows. Ed.

Thank you for your helpful letter of February 24 . . . your point is certainly well taken. As you observe, bulk handling of ammoniated and/or granulated fertilizers is growing fast and has already attained considerable importance.

You may remember that the January story appeared in the Materials Handling and Custom Application section. As such, it was intended to be more of a treatment of the different ways of handling plant food, than it was to cover every possible type of material that can be so applied.

LITTLE ROCK, ARK.

PLEASE QUOTE COST OF 225 EACH REPRINTS OF ARTICLE APPEARING IN FEBRUARY, VOL. 122, NO. 2 ISSUE OF FARM CHEMICALS, ENTITLED "HOW TO PUT MUSCLE IN YOUR MARKETING" BY ERWIN H. KLAUS. ALSO ADVISE TIME WE COULD EXPECT DELIVERY. THANK YOU.

THOM. HOOKS
MANAGER, SALES TRAINING
OLIN MATHIESON CHEMICAL CORP.

Ed. note: The reprints have been delivered to Mr. Hooks. A limited supply is available to other readers from FARM CHEMICALS *at 20 cents each.*

SALESMEN'S SCHOOL

Louisville, Ky.

The kind of training provided by the Fertilizer Salesmen's School is needed badly, and not many salesmen have the opportunity to get this type of training unless the plant food industry does provide it. We agree that stabilization in our market would be good, and the training offered by this school does develop our thinking in the proper perspective in regard to values.

Sincerely yours,
MARION J. SMITH
Sales Manager
PRICE CHEMICAL CO.

College Park, Md.

FARM CHEMICALS Vol. 122, No. 2, February, 1959, carried a great story on Fertilizer Salesmen's Training School. More power to those who conceived the idea and inaugurated the School!

From the article it would appear that the sole target is the Farmer. The word "Farmer," "Farm" or "Farming" appeared 27 times. One speaker said "Grower." The word "customer" was used once.

We are quite sure that everyone is aware of the tremendous potential in sales of fertilizer on the millions of acres of turfgrass. We assume that, for this first School, it simplified things to beam everything at the farmer—not to complicate the picture by discussing other potential sales.

If, at some time in the future, there will be serious consideration given to learning how to sell fertilizer to Turfgrass Customers, please advise us so that we may participate.

We believe that there is needed a down-to-earth lecture or series of lectures on "How to Sell Urea-form Nitrogen." We have about concluded that Urea-forms are not well understood. A listing of "misstatements" one encounters in the field would be quite long and would make an interesting study for students.

. . . when turf is to be discussed in the Salesmen's School, I want to be there.

Sincerely yours,
For better grass
FRED V. GRAU
Chief Agronomist
NITROFORM AGRICULTURAL CHEMICALS

"WET PROCESS" ARTICLE

Louisville, Ky.

. . . I read Larry Byck's article with a great deal of interest and he deserves congratulations for a fine job in explaining various problems and characteristics of manufacturing wet process phosphoric acid. . . .

Sincerely yours,
SAM E. SHELBY
Vice President
FEDERAL CHEMICAL CO.

MORE ON JANUARY ISSUE

New York, N. Y.

. . . FARM CHEMICALS has an attractive new appearance, and I think you and the rest of the folks on the staff should be congratulated. Your January issue came across my desk the other day, and it seemed to stand right up and invite me to read it all the way through. . . .

Sincerely,
R. L. GIBBS
ALBERT SIDNEY NOBLE
ADVERTISING

NON-CHEMICAL INSECTICIDES

Lincoln, Neb.

Last week we received the two tear-sheeted copies of the article "Non-Chemical Insecticides" by Peter C. Crolius (February FARM CHEMICALS). These copies have been circulating around in the Department—now several of the staff members and graduate students wish copies for their personal reference files. Would it be possible to get ten more copies—if available?

Sincerely yours,
(MRS.) ESTHER A. SCHOCK
Librarian
Dept. of Entomology
UNIVERSITY OF NEBRASKA

SOIL SAMPLE LEAFLET, POSTER, SLIDES BY NPFI

"How To Take A Soil Sample" is the title of a new four-color cartoon leaflet just published by the National Plant Food Institute. This happy marriage of sound information with a cheerful tone should be a big help in further promoting soil sampling with farmers throughout the country.

Single copies of the leaflet are free, and bulk orders are $2.00 per hundred, plus postage, from the NPFI Publication Department at 1700 K St., Washington 6, D. C. If you plan to imprint your company name and a message on the leaflet, you should get details from NPFI.

This soil testing explanation also is available in poster size (16x23 inches) and in a set of ten 2x2 inch color slides. Posters are $15.00 per hundred, plus postage, and slides are $2.50 per set.

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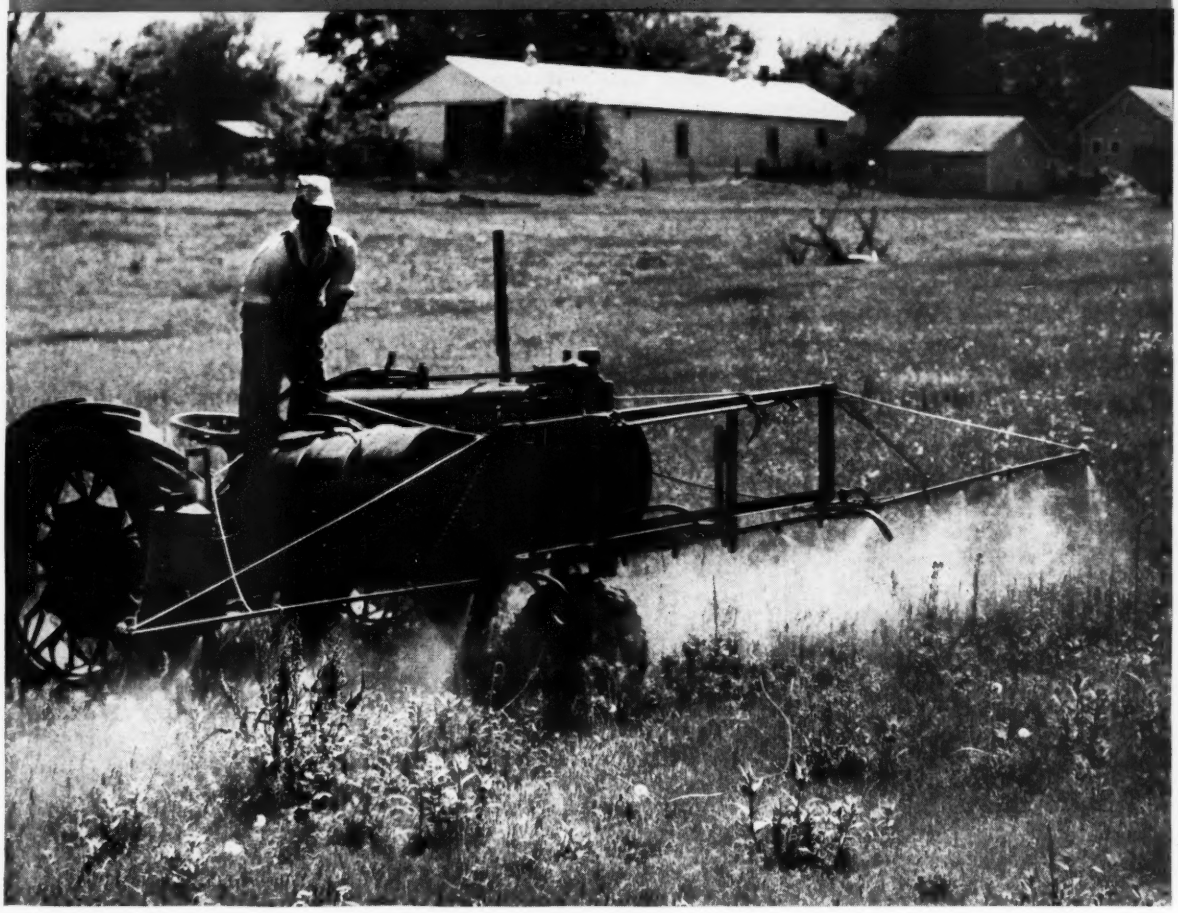
HEAVY AROMATIC NAPHTHA



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because it has . . . ● MILD odor ● LIGHT color ● HIGH volatility, insuring low plant toxicity ● BETTER consumer acceptance.

Use Penola HAN for top quality pesticides, too. Penola HAN is marketed by the Penola Oil Company, manufacturer of Flit—the greatest name in insecticides. For information on how Penola HAN can improve *your* product, just contact your nearest Penola office or write: Penola Oil Company, 15 W. 51st Street, New York 19, New York.

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WASHINGTON VIEWPOINT

▸ *Outlook for the farm chemicals sales year now underway: Brightest in many years. Key reasons are bigger acreages, good 1958 farm income, sound farmer credit positions, government guarantees on corn and cotton.*

▸ *Justice Department in support of last year's gypsy moth—DDT decision.*

A farm chemicals boom year is in the making for 1959. Unless all signs fail, a combination of circumstances points unmistakably to the greatest potential for sales in many years. There are three major reasons for the outlook.

Reason 1: Farmers intend to add more than 8 million acres to total crop production this year, the first increase in plantings since 1953. Total acreage will be about 339 million this year, according to the Agriculture Department's planting intentions survey.

Reason 2: Farmers have the money to invest in larger production this year. Gross income of $38 billion in 1958 was up almost $4 billion from the year before—biggest jump since 1951. It's also the most gross for farmers in history. Net income was up $2.3 billion to $13.1 billion—biggest 1-year jump in 18 years. Much of the increase will be spent in the first half of 1959.

Reason 3: Farmers are in the best credit position in years. Bigger 1958 income permitted them to pay off more debts to make way for new loans. And government price-income guarantees on two of the key farm-spending crops, corn and cotton, amount to virtual pay-back guarantees to farm lenders. (*See page 22.*)

Corn plantings in 1959 will cover the biggest acreage in 10 years: 84 million acres, up 9 million from 1958. This is the largest one-year increase in plantings on record. It stems partly from the favored position of the major feed crop on the government price support schedule, partly from good current prices, partly from release of land from last year's Acreage Reserve. Significant fact to farm chemicals industries: The major part of the acreage boost is coming in the main Corn Belt, which has a large proportion of farmers who recognize the value of fertilizer and pesticides.

Corn growers can't lose by increasing expenditures on fertilizer and chemical weed and insect protection. Perhaps more than ever before, they've got a sure thing: A price guaranteed by the government, which is higher than last year's price support level for 85% of the growers. With this price protection, they've indicated their intent to go all-out on production—and their desire to spend the necessary cash to assure biggest crops possible. This is an open invitation for hard selling, and constitutes one of the best farm chemicals opportunities in a long time.

How much fertilizer will be used on corn this year? Statistical projections have their weaknesses, but the following simple projection may cast some light on the question:

Latest available figures are for 1954. In that year, 80 million acres of corn were harvested. Of these, 60% or 48 million acres received commercial plant food. If the percentage has held constant since that time, 50 million acres would be fertilized in 1959 (allowing for abandonment and diversion from planted acreage).

But plant food applications are known to have increased during the past 4 years. Projecting the percentage gain from 1950 through 1954 to the period 1955–58, actual 1958 fertilizer use may have hit 74% of harvested acreage. This would mean that 54.4 million acres out of 73.5 million received commercial nutrients in 1958. Applying the 75% projection to prospective 1959 harvested acreage of 82½ million—the outlook suggests a total of 61 million acres will be fertilized in 1959. If so, it would mean an increase of 6 million acres will be fertilized this year over 1958.

Cotton growers also can't lose. Actual acreage to be planted to cotton won't be known officially until July. But several known factors indicate a strongly favorable climate for plantings, cotton prices, and farm chemical sales. Here's why:

Under the 1958 farm law, growers could elect to: 1) Stay within allotments and get support at 30.4 cents a lb., or 2) overplant allotments 40% for support at 24.7 cents a lb. The deadline for making the decision has passed, and USDA reports that 85% of the growers will stay within allotments this year to get the higher price guarantee.

Until this year, USDA supported cotton prices primarily through loans. But now, for the first time, the government is offering to buy outright all the cotton produced by growers who stay within allotments. With 85% of the growers planning to stay within the allotment, this means that most growers are guaranteed a price based on an average of 30.4 cents a lb.—and, more important, they can figure production costs and returns more accurately than in many past years.

Cotton plantings will be up from last year's relatively low 12.4 million acres, according to experts in the field. The allotment this year is essentially the same—16.3 million acres—but the government's pur-

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38 plants of the A.A.C. Co., located in the United States, Cuba and Canada, with main office in New York, assure you dependable, fast deliveries of AA quality products for farm and industry. You can schedule your production with confidence . . . the right quantity and grade will be at your plant when you need it.

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What's Coming Next Month

Have you noticed all the emphasis on the *salesman* in this magazine since we started our new marketing approach—as well as the *response* (see *Letters*) all this recognition has brought from readers? Most people probably agree on one point: We have a tendency to not sell him short, but rather *train* him short.

FARM CHEMICALS intends to do something about this situation, beginning *next month* with the first article in a series on

■ SUCCESSFUL SALESMANSHIP

Where, when and *how* to press the prospects' "hot buttons" of acceptance for your *product*, service or viewpoint! The author personally questioned more than 400 sales managers in this field and many others in 1958 in an editorial survey of his own. Object: to determine at first hand the subjects most directly and deeply interesting to salesmen and their bosses.

■ FILMSTRIPS SELL PRODUCTS

They aren't meant to supplant your salesmen, but filmstrips can create a degree of "believability" unattainable in any other presentation. This article shows how to use filmstrips in selling.

■ TRIAZINE COMPOUNDS

Field reports about Simazine plus experimental work with Atrazine and triazine compounds still in the code number stage.

■ HOW TO SELL HERBICIDES

A one-man war against apathy concerning losses due to weeds brought herbicides into the picture in a big way among New York gladioli growers. This article proves once again how effective county agent demonstrations can really be in selling pesticides to skeptical growers.

. . . in the new

FARM CHEMICALS BPA

WASHINGTON VIEWPOINT

chase program provides a better incentive to plant all allotted acres this year.

Moreover, the 1959 national allotment has been increased by about 1 million acres, to about 17.3 million, by the decision of 15% of the growers to overplant their allotment 40% and take a chance on direct market sales. Indications are that cotton plantings this year will come closer to the total allotment than in most recent years. A conservative estimate is total plantings of at least 15 million acres—up 3 million from 1958.

Second round DDT trial coming up. The Justice Department now has submitted its brief to the U.S. Circuit Court of Appeals in support of a lower court's ruling in last year's DDT trial. The U.S. District Court for the Eastern District of New York last spring turned down the request of a group of Long Island citizens to issue an injunction against future mass DDT spraying against gypsy moth. The citizens appealed to the higher court.

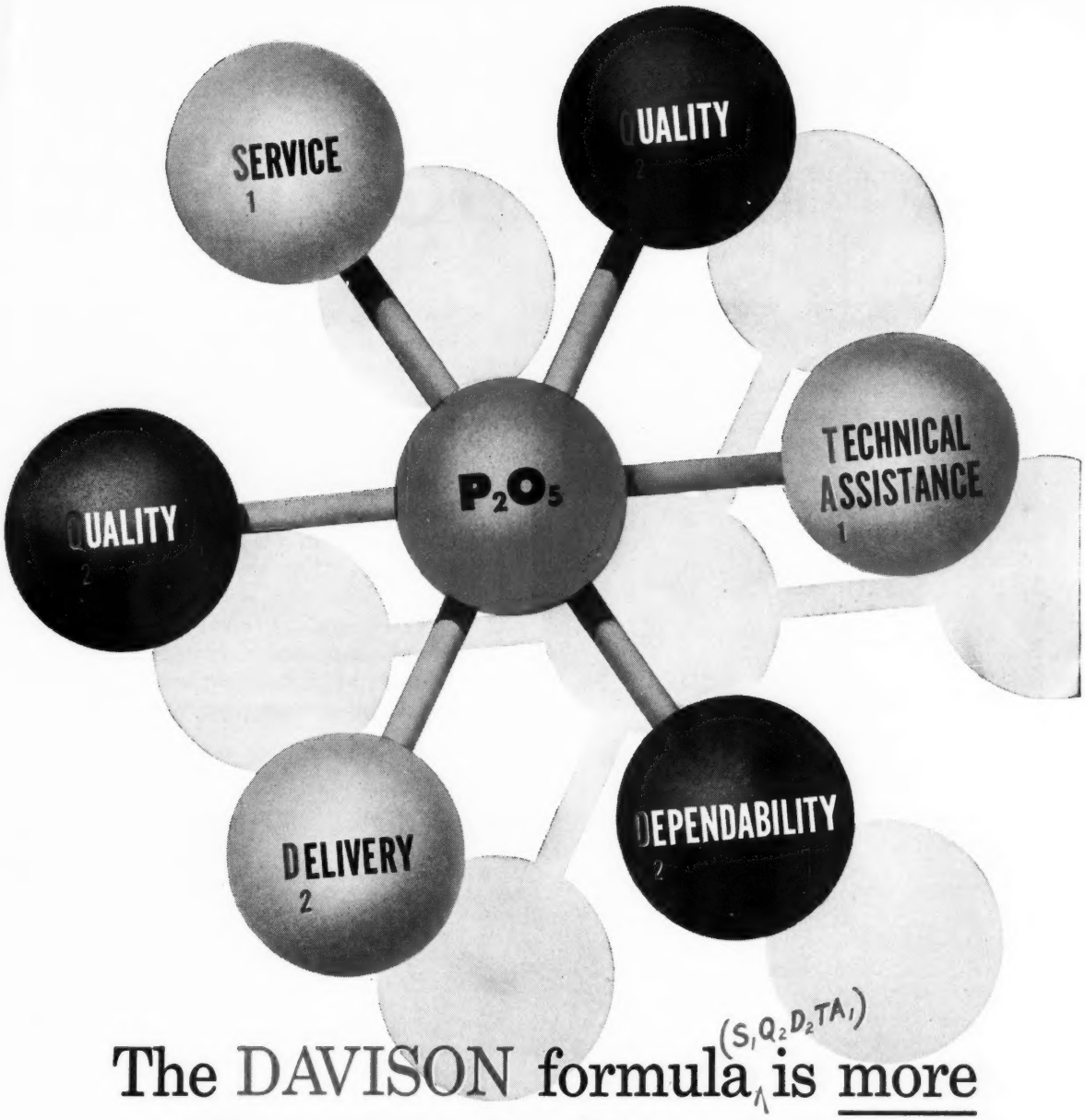
Justice's position: The case is moot since the challenged aerial spraying of Long Island was completed in 1957, and no threat of such action appears in the foreseeable future. Also, the complaint should be dismissed because the lower court lacked jurisdiction over the Secretary of Agriculture, who has the statutory authority to conduct the cooperative gypsy moth program. Furthermore, Justice argues, the aerial spraying of plaintiff's properties with DDT did not constitute a violation of constitutional rights.

Decline in antibiotic effectiveness in swine "under research conditions" has been reported by Damon Catron, Iowa State's pioneer researcher on antibiotic swine rations. He says: "There appears to have been a gradual decrease of the response to antibiotics in gains and feed efficiency in growing and finishing pigs under swine nutrition research farm conditions."

Apparent causes, according to Catron: 1) Possible increase in harmful organisms that have always been unaffected by antibiotics; 2) possible increase in resistant strains of certain organisms; 3) in some cases, an increase in fungus growth in the gastro-intestinal tract; 4) some of the decrease in response may be simply the result of improved nutritional balance in feed; and 5) changes in management practices.

Farm chemical sales increasingly will be made to fewer but larger farm operations. An indication of the number of contacts likely to be available in 10–15 years comes from an agricultural economist's forecast of how many commercial farmers there will be in coming years.

Raymond H. Tremblay of the University of Vermont predicts that the changes in agriculture will settle down at a level of about one million farmers. He points out that there are now about 2 million key producers in the U.S. These "may be halved in coming years." As the number shrinks, investment per farm will increase—perhaps to $500,000 per farm.



The DAVISON formula ($S_1Q_2D_2TA_1$) is more than just Quality of product

Make no mistake, we do not underrate the importance of quality. We know that the Davison Hi-Flo Triple Supers (Run-O-Pile, Gran-U-Lated and Blend-Phos); Davison Normal Supers; Phosphate Rock and Phosphoric Acid are unexcelled by any on the market.

But Davison considers that the important "pluses" . . . Service, Quality, Dependability, Delivery, Technical Assistance are equally important in determining a source for your needs. We consider them all parts of our product.

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DAVISON CHEMICAL DIVISION
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Hi-Flo Run-O-Pile Triple Superphosphate...*46/47% available P_2O_5.*

Hi-Flo Gran-U-Lated Triple Superphosphate...*guaranteed 46% available P_2O_5.*

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Phosphate Rock *All Grades.*

Phosphoric Acid
75% H_3PO_4—54.5% available P_2O_5.

WONDERWALL™ cuts by up to 90% for

Mr. Campbell (standing) and Mr. C. L. Pickhardt, National Gypsum transportation engineer, check on WONDERWALLS loaded in a freight car.

"WONDERWALL bags have helped us reduce breakage as much as 90%," states Mr. Robert Campbell, Manager of Packaging, Products Division, National Gypsum Company, Buffalo, N. Y.

"We estimate our present breakage rate with the WONDERWALL bag at less than one bag in a carload of 600 units. This is a reduction of 90% in our previous breakage rate in shipments going to certain difficult destinations.

"This improvement in package durability was accomplished without increasing the unit cost of the bags. There's no way to estimate the value to this company of the goodwill

The WONDERWALL places quickly on the packing spout because the Clupak extensible paper used to make this multiwall is so flexible. This flexibility also allows the bag to be handled easily.

The resiliency of the new kraft paper resists the weakening effects of plant handling, keeps the bags in better shape to withstand the shock of shipping.

bag breakage National Gypsum

gained by eliminating this sore spot in customer relations.

"West Virginia's WONDERWALL bag has won our wholehearted approval from both the performance and cost standpoints. Its success has prompted us to change bag specifications so as to use extensible type paper bags in all thirteen of our plants making plaster products."

WONDERWALL is the great new multiwall bag from West Virginia Pulp and Paper. WONDERWALLS outperform ordinary multiwall bags because they are made of Kraftsman Clupak* Paper—the new, extra tough kraft that stretches. WONDERWALLS pack faster, handle easier and stack better, too.

Try this superior, new multiwall. Order a trial shipment of 5000 WONDERWALLS on your next carload. Write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Ave., New York 17, N.Y.

See it at our exhibit,
AMA Packaging Exposition, Chicago

West Virginia Pulp and Paper

**Clupak, Inc.'s trademark for extensible paper manufactured under its authority.*

In some cases National Gypsum stores the bags before shipment, stacking them three to four pallets high. This places a 6000 pound pressure on the bottom bags, but the extra tough WONDERWALLS do not break.

WONDERWALL™
Best bag of all

WHAT'S DOING IN THE INDUSTRY

METCALF BILL WOULD BOOST PESTICIDES-WILDLIFE WORK

A bill now pending before Congress would increase Interior Dept. appropriations for pesticides research from the $280,000 granted last year to an annual fund of $2,565,000. Introduced by Rep. Lee Metcalf of Montana, HR 5813 has been called "not an unreasonable request" by a Fish and Wildlife spokesman. USFWS, cooperating with the Department of Agriculture, currently is handling pesticides-wildlife research programs.

Said Rep. Metcalf, "This (2½ million-dollar) sum is the amount actually needed by the Secretary of the Interior to study various aspects of the pesticides problem . . . to assure that the future use of chemical controls shall not inflict irreparable damage on the Nation's fish and game resources and farm animals."

The Congressman—long noted for his intense interest in conservation problems—detailed his bill in a 23-point program. Among points to be studied would be the effects of long-range pesticidal programs on fish, formulations used in the fire ant program, chemical effects on bird migration, contamination of water areas, and others.

Metcalf's office reports that little opposition is expected to the proposed increase. Senator Magnuson, author of last year's $280,000 bill, will throw his support behind Metcalf's bill. The proposed $2,565,000 annual appropriation would include last year's sum and not be in addition to it.

Fish and Wildlife Service reports that of 220 pesticides in use today, only 21 have been fully tested for toxicity to wildlife.

TVA MAKES ITS FIRST SHIPMENT OF NEW LIQUID

On March 25, the Tennessee Valley Authority said it had just made its first shipment of a new liquid fertilizer, ammoniated superphosphoric acid. Two tank cars, each carrying 50 tons, went to the Pacific Cooperative at West Stayton and Klamath Falls, Ore. The new fertilizer analyses 11-33-0.

Some of the ammoniated superphosphoric acid will be used as a straight material on field demonstrations in Oregon. These demonstrations will be established in cooperation with county agents and other state agricultural personnel. In addition to its use as a straight material, it can also be mixed with other ingredients to make high-analysis complete liquid fertilizers. TVA plans to produce 3,000 tons this year for use in research and educational programs.

AAC DIRECTORS RECOMMEND 3 FOR 1 STOCK SPLIT

The board of directors of The American Agricultural Chemical Co. has recommended to the stockholders that the company's common stock be split three for one and that the authorized common stock be increased from 700,000 to 2,500,000 shares. A special meeting of stockholders to act upon the proposal will be held on April 29. If approved by stockholders, it is expected that the split will be effective May 5.

President C. M. Powell said that the company is planning to offer the public additional shares of its common stock shortly after the stock split becomes effective. About $7 million additional equity capital is expected to be raised through this offering.

HOUGH ANNOUNCES CHANGES IN SALES ORGANIZATION

Herman R. Brown has been named sales manager, "Payloader" Div., by The Frank G. Hough Co.

Other sales department changes include appointment of Kenneth B. Larkin as eastern regional manager; Robert L. Knox as central regional manager; Donald O. Ross as western regional manager; Bruce C. Dennett, as assistant to the regional managers, and Charles J. Bernard will assume direction of manufacturers export sales as well as scheduling operations.

THIS MONTH'S Meeting Highlights

MCA Symposium on the Packaging and Transportation of Chemical Products

Cleveland (Ohio) Engineering and Scientific Center

April 29—Welcome by Curtis Lee Smith, president, Cleveland Chamber of Commerce and introductory remarks by Maurice F. Crass, Jr., secretary-treasurer of the Manufacturing Chemists' Association, Inc. Carl E. Pruett of E. I. duPont de Nemours & Co., Inc. will moderate a panel discussion, "*The Chemical Packaging Committee, What It Is and What It Does.*" Pruett is chairman of this MCA Committee. Panel members are T. P. Callahan, Monsanto Chemical Co.; William I. Hanrahan, Steel Shipping Container Institute; Glenn Mather, Fiber Drum Manufacturers Assn.; Robert B. Schaefer, Pennsalt Chemicals Corp. and Robert F. Uncles, American Cyanamid Co.

In the afternoon, a panel will discuss "*The Importance of Regulation in the Transportation of Chemical Products and the Benefits of a Cooperative Approach.*" Moderator: Charles H. Mayhood, of MCA. Participants: Harry A. Campbell, Bureau of Explosives; Victor E. Haninger, Interstate Commerce Commission; John J. Quinn, Federal Aviation Agency; Captain William L. Sutter, United States Coast Guard and Edwin A. Riley, Post Office Dept.

April 30—A panel will discuss "*Transportation and Distribution, Liquid and Dry Chemicals.*" Moderator: Carl P. Greeley, National Distillers and Chemical Corp. and chairman of the MCA Traffic Committee. Participants: Thomas F. Mangold, E. I. duPont de Nemours & Co., Inc.; Lester A. Wilsey, National Tank Truck Carriers, Inc.; James E. Weaver, Columbia-Southern Chemical Corp.; Irby L. O'Brien, Monsanto Chemical Co.; Frank G. Moore, Columbia-Southern; Harry F. Suiter, Merck & Co., Inc.; Frank C. Tighe, Union Carbide Corp. and James F. Haley, Koppers Co., Inc.

During the afternoon, there will be a *workshop and small group discussions.* Discussion leaders: Paul W. Tucker, Phillips Petroleum Co. (moderator); Carl E. Pruett, DuPont; Robert F. Uncles, American Cyanamid Co.; James E. Weaver, Columbia-Southern; Donald M. Long, Pennsalt Chemicals Corp.; Carl P. Greeley, National Distillers and Chemical Corp. and Walter N. Saaby, Victor Chemical Works.

Texaco can save you the freight on 1 car out of 3

NEW 50% SOLUTION GIVES YOU MORE NH_3 PER SHIPMENT

Because Texaco has the handling know-how and equipment, it is now practical to ship aqua ammonia at 50% concentration in either tank cars or tank trucks. You get 57% *more* ammonia than in the same volume of regular 29.4% solution.

At your plant, 50% solution is unloaded and diluted to 29.4% without additional investment in handling equipment.

Thus, two tank cars of Texaco 50% NH_3 solution actually give you more ammonia than three cars of the standard 29.4% solution–saving you shipping costs on one car.

Only Texaco offers you this advantage. In addition, Texaco's technical advisory personnel will be glad to discuss with you any questions concerning this unique saving, development of a new product or improvement of an old one. Possibly Texaco research has already solved a problem similar to yours, saving you the expense of duplicate experimentation.

The box at the left shows you some of the high-quality petrochemicals available from Texaco. Whether you need a product or a process, call or write:

The Texas Company, *Petrochemical Sales Division*, 332 South Michigan Avenue, Chicago 4, Illinois, or 135 East 42nd Street, New York 17, N. Y.

TEXACO PETROCHEMICALS: Aqua ammonia, anhydrous ammonia, nitrogen solutions, diisobutylene, odorless mineral spirits, naphthenic acid, propylene tetramer and rust inhibitors.

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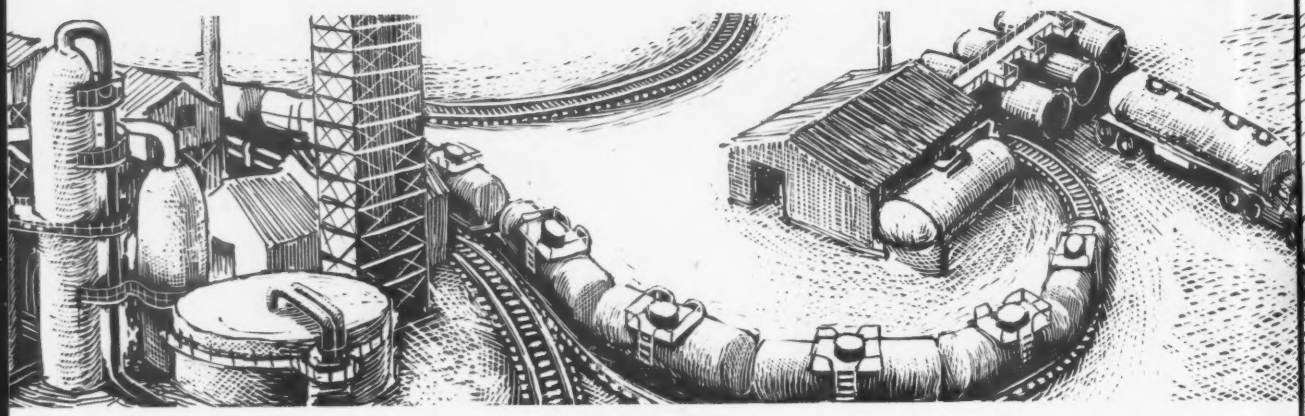
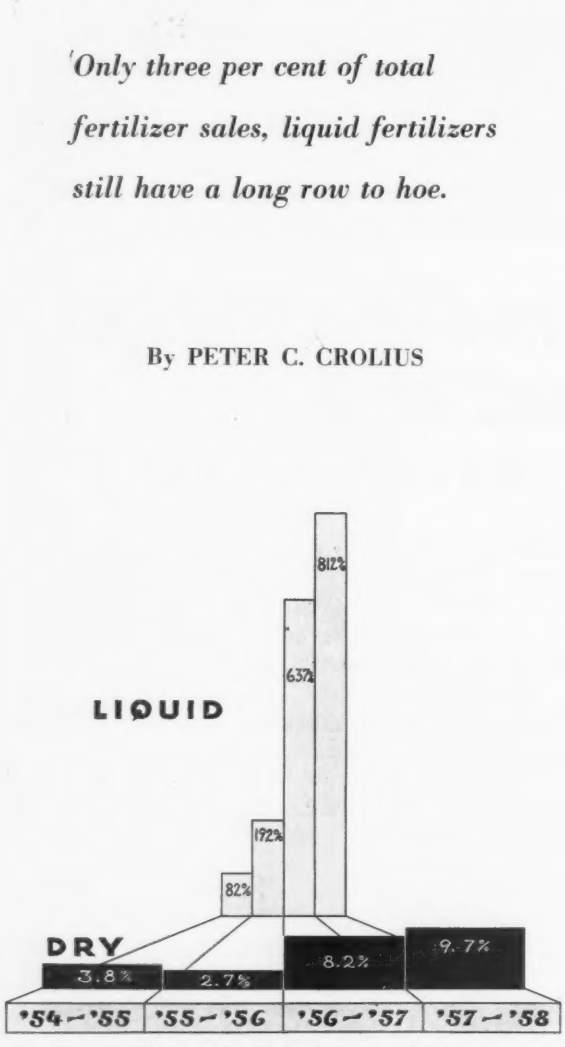


COMPLETE LIQUIDS: IN

Only three per cent of total fertilizer sales, liquid fertilizers still have a long row to hoe.

By PETER C. CROLIUS



Growth of the complete liquid fertilizer industry as opposed to growth of the total fertilizer industry; 1953–54 is used as the "base year" and percentages shown are percentages of subsequent years in relation to 1953–54.

RETICENCE—an inclination to be uncommunicative—marks the general feelings in, about, and for the complete liquid fertilizer industry. There's reason behind the silence . . . yet paradoxically there's every reason for talk—and plenty of it.

Those on the outside plainly are not talking because they don't know much about liquid fertilizers. Those on the inside (the manufacturers) are silent perhaps because they know too much about them. Most users can't see much growth difference between conventional dry fertilizers and the newer liquid forms, so they have little to say. Materials suppliers are keeping their cards close to their chests on general principles. Equipment manufacturers do have something to say if they're queried pointblank. And industry leaders are overly cautious in their remarks—if they make any to begin with—for fear that someone's feelings may be hurt, that favoritism may be expressed or implied, that journalistic or hopeful sensationalism may result.

On the other hand, there's really nothing to holler about . . . *just that the complete liquid fertilizer industry has increased itself ten times in four years. (Had the dry, mixed fertilizer manufacturers done as well they'd be selling in the neighborhood of 40 million tons of primary plant foods a year.)*

Why such a spectacular increase?

PART OF THE TECHNOLOGICAL REVOLUTION

In the 14 years since World War II, this country has seen a technological revolution in agriculture unparalleled geographically or historically. Simply, liquid fertilizers are a part of that revolution, in effect have ridden on the coattails of the larger progression marked by spectacular increases in itself. That liquid plant foods were "on hand" at the right time at the right place was enough to get them off their pads and orbiting.

Prior to 1954, use of liquid fertilizers was confined almost entirely to California and Washington, with a bit in Texas. By June, 1958, there were 294 plants producing mixed goods in solution. By June of this year, there will be an estimated 320 plants on stream

ILLUSTRATIONS By F. P. GOODRICH

S: INCREASE and UNCERTAINTY

or under construction. Latest figures show 52 in Illinois alone and 21 in Indiana and more may have been added since the last tally.

The lion's share of the credit must go, however, to a breed of men relatively unheard of in the ultra-conservative fertilizer industry. These are the pioneers, the drummers, the local visionaries, the go-getters. Faced with the time-honored come-and-get-it attitude in a conservative business, these men reversed their procedures with a let's-get-out-and-sell-it policy. In short, the "new breed" made their own opportunities.

One such group of opportunity-makers are the Aylward brothers—Edwin, Arthur and Leon. They were the first to introduce complete liquid fertilizers to the central Midwest.

Edwin, the oldest, president of the Aylco Liquid Fertilizer Company, began handling dry fertilizer as an adjunct to a feed business established at Sullivan, Illinois, in 1939. His interest in liquids was aroused by reports from the West Coast. The more he thought it over, the more he became convinced that the deep-soiled prairie land of Central Illinois presented an ideal market for the new type of fertilizer.

THE BIGGEST QUESTION

Surveying the ground carefully, studying the potentials of a liquids business in Illinois from every angle, Edwin Aylward didn't court misfortune by rushing headlong into the business. Plant construction, formulation techniques, materials sources, dealer organization, application equipment, sales and promotion methods—these and other facets had to be considered. Biggest single question: *Customer acceptance!*

Considering that *only one farmer in a hundred had heard of liquid fertilizers*, acceptance was very good that spring of 1954 when Aylco turned its first dollar. As acceptance and demand increased, so did distribution problems. In 1955 a second plant went into production in El Paso, and in 1956 two more at Harvel and Rochester.

"We realized that if we were to succeed," the older Aylward says, "we had to do more than just sell fertilizer. *We had to sell a fertility program.*"

And sell a fertility program they did . . . and are . . . and will. In fact, Aylco bases its entire sales program on the *agronomic* approach aimed at achieving progressively higher yields yet geared to a customer's individual operation. It is designed to hold every customer indefinitely, once gained, and divert his thinking from the *cost* of fertilizer to the *profits* from it.

With the hiring in 1954 of Cecil Baylor, a farm management and agronomy graduate from the University of Illinois, the Agronomic approach slipped into high gear.

AN AGRONOMIC SALES MANUAL

To Baylor fell most of the educational responsibility —educating dealers, salesmen, custom applicators and farmers in the economics of fertilizer. A major accomplishment was the compilation of a comprehensive agronomic sales manual. Every salesman, dealer, and custom operator became thoroughly familiar with its contents.

Although others in the industry might take Baylor to task, he still asserts that liquid fertilizers are "the best thing that ever happened for agriculture. Absolutely uniform application, instant availability, and complete, accurately balanced fertilizer in a one-shot application." (Other enthusiastic remarks heard in the industry make frequent use of the words "convenient" . . . "speed" . . . "ease" . . . and "flexibility.")

Commenting on the competitive aspect of the business, Edwin Aylward declares, "We were never out to steal business from anyone. *We think it's the responsibility of every fertilizer manufacturer, wet or dry, to develop the waiting market, not compete with each other for existing business.*

"There are eight and a half million acres of cornland in Illinois," he continues. "If it were adequately fertilized, our total production facilities in the state at present would not be adequate to do the job."

The building of Aylco's El Paso, Harvel, and Rochester plants points up one of the larger problems of the liquids industry—distribution. In the solutions

Cecil Baylor (left), Aylco agronomist, discusses agronomy manual with Ralph Cordts, farmer customer.

form, complete fertilizers cannot be stored as easily nor as cheaply (3:1 cost ratio) as dry materials.

This forces most manufacturers into becoming custom applicators or at least arranging for custom application to be done. Custom operation becomes less profitable the farther the job is from the base of supply, so most liquid plants sell within a 20- to 30-mile radius—and 15's even better. (Solid mixed goods can be profitably distributed up to a 100-mile radius, generally speaking, and some is sold much farther than that.) A liquids producer may find it more profitable to put up another plant than to extend his storage and distribution facilities . . . and his headaches.

This, in turn, brings up another consideration: plant investment costs. Says *Ag and Food Chemistry*, "When it comes to capital investment and other yardsticks, the economics of solids vs. liquids are somewhat vague, often confusing, and always arguable." Quoting TVA's A. V. Slack, that magazine reports that an investment in most liquid plants runs in the neighborhood of $50,000. That's a figure often quoted but frequently scoffed at. Another estimate, says *Ag and Food*, puts the investment ratio of dry to liquids at 2.5:1.

"Five short years ago, when this business was in its infancy, there were many of us who were keenly aware of the tremendous potential inherent in the liquid fertilizer business, but we all wondered just how rapidly it would build up. I think the answer is apparent today! The fellows who are giving their customers a quality product, excellent service, and using good judgment in making recommendations for the use of liquids, are in the business to stay. For those who forget the essentials of good business, there will be a day of reckoning! We have open to us the threshold of success, the most challenging year for this industry that we have ever know! Now it's up to us! Let's do a good job!"

E. E. Crouse
Past President
National Fertilizer
Solutions Association

What about the return on plant investment?

"On the average, if you've made no serious mistakes, you can expect to put in four or five years before you realize any substantial returns on your investment," says Ed Crouse, head of the C-D Liquid Fertilizer Corp., Liberty, Indiana, and one of the ablest operators in the business. The C-D plant at Kitchell, Indiana, has an investment of about $220,000.

SELL ADVANTAGES, NOT PRICE

"Success depends mainly on the selling job," he states. "You have to emphasize the advantages of liquids and forget about price competition. The dry people, especially the blenders and straight materials bulk handlers, can beat you there."

Liquid manufacture, he explains, requires the use of more costly, highly soluble materials. On the other hand, he says, application of blended materials is not as uniform as liquids because of varying particle size. Crouse should know. He's had approximately 20 years experience in handling dry fertilizers.

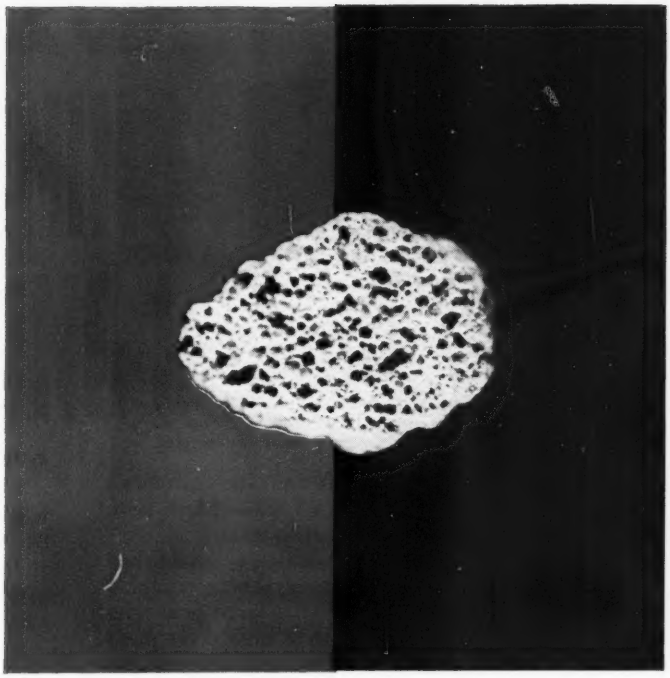
If it were not for the price of P_2O_5, liquid operators would have a long headstart on dry manufacturers. Price of nitrogen and potash is about the same for each kind of material. But in a liquid fertilizer operation, furnace grade phosphoric acid is generally used—and it comes high, as much as 75 per cent higher than other P_2O_5 sources. Furnace grade phosphoric acid used in complete liquids is usually the oversupply of that acid from industrial markets but pegged at a lower price (still high) for the fertilizer trade. On the other hand, development of a more refined grade of wet process phosphoric acid will undoubtedly put more of that material in liquid fertilizer channels at a lower price than furnace grade. At least three producers of wet process acid and TVA are currently working on the impurity problem. Progress to date "is fairly promising," according to a government spokesman. This may well be the key to the future expansion of the entire liquid fertilizer industry.

Problems like price of P_2O_5, economics of distribution, and farmer acceptance lead Charles Bertsch of Warsaw, Indiana, to warn: "*You should emphasize right at the start that while liquid fertilizers have a definite and growing place in the industry, manufacturing them is not a get-rich-quick proposition.*" Bertsch is manager of U. S. Liquids Corporation which operates five plants supplying 80 dealers in northern Indiana.

Like Aylco in Illinois, both Crouse of C-D and Bertsch of U. S. Liquids utilize the agronomical approach modified to fit individual farming conditions. Both provide soil analysis facilities—or will send the samples to state laboratories if the customer prefers. Good management principles are advocated as much as possible.

"We are getting a better informed kind of farmer," Bertsch points out. "We are glad to make recommendations and prescribe programs when they are

Swift's PC-47



This particle of Swift's PC-47 Triple Superphosphate is magnified 9 times actual size.

The 47% A.P.A. Triple Superphosphate with over

14 BILLION AMMONIA TRAPS PER TON

That's positive ammoniating-ability — the kind that builds satisfaction and repeat sales.

Swift's new PC-47 Triple Superphosphate is the result of the extra care Swift devotes to making its phosphate operations serve you better . . . the same extra care in processing to assure complete uniformity of grade and grind . . . the same extra care that satisfies your delivery requirements.

Before you settle on your source of triple superphosphate, phosphate rock or ground phosphate, ask to have a Swift Phosphate Center representative outline what extra care can mean to you. Or write for illustrated brochure to SWIFT & COMPANY, Phosphate Center, Bartow, Florida.

THE SERVICE SOURCE FOR ALL YOUR PHOSPHATE NEEDS

To Serve Your Industry Better

Swift
104TH YEAR

P-2

**WITH PHOSPHATE ROCK,
GROUND PHOSPHATE ROCK
AND PC-47 TRIPLE SUPERPHOSPHATE**

Roy Ambrose (left), C-D truck driver applicator, is told by Wayne Harlan where a load of complete liquids should be put. Tank on truck is made of fiberglas.

desired, but we can't afford to discount the customer's own intelligence and wishes. Our main effort is to provide adequately balanced fertilization."

The fact that liquid fertilizers were established around the idea of custom application is boomeranging to some degree. Ability to cover a large area adequately in the rush season makes a large investment in application equipment mandatory. When the season's over, much of this equipment may stand idle. The same principle may be applied to labor: it's not easy to secure the services of a competent custom operator on a part-time basis, particularly in the spring. On the other hand, it's financially impractical to keep an adequate force permanently employed. For these reasons, plus the distance-efficiency economic facts of life, an effort is being made to promote customer-owned application equipment.

With the customer doing his own liquid spreading, he'll necessarily be forced into a further investment—storage facilities. Currently most tanks are owned by the producers and are loaned to farmers. But the push is on to get farmers to buy their own tanks of sufficient capacity for a day's operation.

Tanks cost big money. And at current price tags, neither producer, dealer, nor farmer can afford to invest heavily . . . particularly in view of limited time use. More progressive producers are looking away from conventional steel and aluminum tanks towards other materials which show promise of lower cost and higher anti-corrosive qualities.

FIBERGLAS AND RUBBERIZED TANKS

Fiberglas tanks are already appearing in the trade and are being applauded. (Ed Crouse, for example, is promoting fiberglas tanks among his farmer-customers. He's used them with success.) Under consideration are "pillow" and "bladder cell" rubberized containers, outgrowths of the aviation industry, which are collapsible, corrosion resistant, and allow transporters to use conventional flat-bed trucks and get two-way payloads. Another rubberized tank being checked out for over-the-road deliveries is the "rolling fluid transporter." Towed singly or in tandem, tanks look like oversized tractor tires. Advantages: the tire is the tank, can be towed anywhere by any vehicle, requires no maintenance, is weatherproof.

Concrete and even wooden tanks are being restudied. And when it comes to plastics—particularly plastic liners—the lineup of potential materials is endless. Names which keep popping up: polyvinyl chloride and neoprene. An Ohio custom fabricator reports that PVC and other co-polymer plastics effect savings in maintenance, repair, and replacement which will offset higher initial investment within five years.

So . . . in a brand new industry pockmarked with problems, there's still that one outstanding fact—a ten-fold increase in four years! Assuming that the trouble spots occur in no greater numbers nor in greater proportion, there's only one way the industry can go—upwards.

OVERCOMING OBSTACLES

The way things are looking now, the P_2O_5 problem will be minimized in the near future with the production of higher purity wet process acid. Storage and transportation obstacles are being overcome bit by bit. The hardest problem to lick remains customer acceptance and demand and all that goes with it.

"We haven't had one farmer who didn't think liquids were better than dry fertilizers," says Dallas Culver, a Delaware producer. And one of Culver's customers asserts he'd rather have 300 pounds of liquid than 500 pounds of dry. But these viewpoints are few and far between and may be based on dry-year observations, individual successes, psychological preference, or other hard-to-nail-down reasons.

Simplicity and convenience is selling—and will continue to sell—liquid fertilizers, all things being equal. But even the simplicity and convenience angle may lose ground in the face of the rising trend of bulk dry fertilizer spreading. Custom bulk dry application carries a distinct price advantage which liquids producers will find increasingly hard to beat at the current technological level.

(Experiments at Illinois Agricultural Experiment Station indicate that liquid mixed fertilizers are just as good as the same amount of nutrients applied in dry form—but no better.)

How far will liquids go? That's anyone's guess.

Talk has been heard in the Midwest that liquid sales have dropped off. What's probably more to the point is that *rate of sales increase* has leveled off. Certainly that was to be expected. The spectacular rise of liquids will continue upwards but the trend will be towards the less spectacular and towards more conservative—and healthy—growth. Standing now at about three per cent of the total plant food consumed in this country, use of complete liquids may rise to eight or nine per cent in the next ten years.

The way things are shaping up for the 1959 crop year—corn plantings will be up 12 per cent over last year—total fertilizer consumption will rise and liquids will ride the upswing. Considering the consequences of a strong fertilizer season, this may be liquid's key year.

But no one's saying much. ▲

FULL ORBIT SALES TRAINING MEETINGS A SMASHING SUCCESS!

Full Orbit blazes another new trail in customer service — this time in the interest of upgrading the merchandising practices of the industry. In response to customer requests, 10 sales training meetings were held in key cities around this country and Canada with the sole objective of helping fertilizer manufacturers sell more merchandise profitably. Theory, platitude and generalities were excluded. These were intensive two day sessions devoted to practical, down-to-earth treatment of specific problems chosen by the audience in advance. Approximately 400 representatives of 300 manufacturers were present with middle and top management represented as well as salesmen.

We are sorry if the timing did not permit you to be among them. However, ask our representative to tell you about the many other Full Orbit services — all designed to help you sell more fertilizer profitably.

Here's what fertilizer manufacturers are saying:

William Lust, Tyler Fertilizer Company, Tyler, Texas: "This was a very fruitful meeting for me. It covered specific points and I wish others in our company could have been here."

Forest Viator, Louisiana Agricultural Supply Company, Baton Rouge, La.; "Our time here was well spent, and not wasted. It covered fundamentals, not flashy promotion. It was the best meeting, from a standpoint of being organized, that I can remember attending."

Archie T. Edwards, Red Star Fertilizer, Sulphur Springs, Texas: "Our group was pleasantly surprised by the number of good ideas and good principles covered. We're going to make good use of them and I hope others get a chance to attend."

Stanley Hackett, President, Dixie Fertilizer Company, Shreveport: "This type of meeting should be expanded. I know it's primarily for salesmen, but I got a lot of good out of it as a company president, and hope it's put on again in this area so more people can attend."

Joseph Stobaugh, Southern Cotton Oil Company, Little Rock, Ark,: "This meeting has been rewarding to our group. It reminded us of some places we may have slipped in our selling, and it shows the need of stressing product quality."

T. H. Golson, Wesson Oil & Snowdrift Company, New Orleans: "This has been one of the best meetings I have attended from the standpoint of bringing back some of the things we might have known but have quit using. It covered fundamentals and will be helpful to industry because it gives them something to think about besides price."

R. G. Dozier, Jr., Dawson Cotton Oil Company, Dawson, Ga.: "I am thankful for this very educational and constructive meeting. I got a lot out of it."

Les Engler, Commonwealth Fertilizer Company, Russellville, Ky.:"It was a very profitable meeting and was handled in a stimulating manner."

Producers of Living Minerals

MINERALS International CHEMICALS

20-59

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

Administrative Center — **Skokie, Illinois**

THIS IS HOW FARMERS RATED VARIOUS SOURCES OF PRACTICAL INFORMATION

SOURCE	RATING*
County Agent	72
Agricultural College Publicat'ns	38
Farm Magazines	30
Local Dealers	26
Neighbors	20
Manufacturers' Salesmen	5
Radio & Television	4
Newspapers	2
Others	4

*Percent of highest possible rating

G 106

COSTS AND PROFITS
Ohio Corn

YIELD PER ACRE	PRODUCTION COST PER BU.	PROFIT* PER ACRE
39 bushel	$1.00	$ 0.00
59 bushel	.84	9.55
75 bushel	.80	15.10

*Corn at $1.00 per bushel.
Source: Ohio Bankers Association

MARKETING

Help your farmers obtain m

TODAY'S FARMER desperately needs credit to survive in his highly competitive market. Every fertilizer manufacturer realizes, too, that credit helps to move more *goods and services* that the farmer needs. However, he is more than happy when he can stay out of "competition" with his local banker and use his money for more productive purposes.

Credit is the "lubrication of commerce," L. C. Kennedy, credit manager of California Spray-Chemical Corporation, told members of the California Fertilizer Association at their convention last fall.

But he warned that "liberalization of credit policy is no substitute for sales effort and in the long run, a loose credit policy tends to bring about a stagnation of sales."

Kennedy pointed out that the credit policies of the fertilizer industry seem to run in cycles, and that he recalled a period of genrally loose credit which brought it to such a pass that it was forced to drastic measures, and withdrew all credit terms for a time.

He said that it took ten years to get this straightened out. There are signs of trouble again beginning to appear with increasing frequency.

He added that the industry should profit from what happened in the past, with one alternative being business stagnation.

That's because its money will have been diverted from productive uses into competition with banks.

THREE ESSENTIALS TO CREDIT

He set forth three essential items as the basis for a profitable credit administration:

- a sound understanding of the customer's position, based on knowledge rather than faith.
- to provide for the proper use of working capital and to assure a continuous and adequate flow of funds, both to carry on and to build the business.
- improved customer relations.

BANKS LAG BEHIND

The farmer's need for credit, and the bank's failure to fully understand this need, however, has brought many credit services into the picture—such as cooperatives, production credit associations, insurance companies, Farmers Home Administration, rural credit unions, personal or small loan companies, and even merchants and dealers.

Fertilizer companies are up to their necks in credit and at times it appears that there's no way out. Credit is the *bank's* responsibility and that's where the business logically belongs.

But when the bank fails to measure up, it's just good business for you to help your customer to shop around for his best credit buy. (*See chart below*).

There are some encouraging signs, however, that banks are facing up to the agricultural credit problem—based on these statements made at the Agricultural

CREDIT BUYING GUIDE

TYPES OF CREDIT	SOURCES OF CREDIT	LENGTH OF LOAN IN YR.	INTEREST RATES %	CAN BE RE-NEWED
CHATTEL MORTGAGE OR UNSECURED LOANS (short and intermediate term loans)	Commercial Banks	1 to 20	4½-7	x
	Product Credit Association	1 to ?	5-6 on unpaid bal.	x
	Farmers Home Administration	1 to 40	3-5	—
	Merchants and Dealers	varies	varies	x
	Individuals	varies	varies	x
	Rural Credit Unions	varies	6-9 1% on unpaid bal. for installment loans	—
	Personal or Small Loan Companies	varies	varies	x

COSTS AND PROFITS
South Carolina Cotton

YIELD PER ACRE LINT COTTON	PRODUCTION COST PER LB.	PROFIT* PER ACRE
292 lbs.	$.28	$ 15.51
500 lbs.	.22	56.94

Lint at $.329 per lb.
Seed at $50.00 per ton.

Source: Clemson College SC 5-N

IRRIGATED ALFALFA HAY
Washington State

YIELD PER ACRE (TONS)	PRODUCTION COST PER TON	PROFIT PER* ACRE
3	$18.92	$ 18.25
6½	12.07	84.03
8	11.19	110.50

*Alfalfa Hay @ $25.00 per ton.

Source: Washington State Bankers Association WASH. 12-N

Bank farm programs have their beginning with the release of worthwhile information such as that shown above, making more credit available to farmers for fertilizer purchases. To give your program a boost, be sure your banker sees this material.

more credit for fertilizer

Credit Conference of the American Bankers Association in Omaha, Nebraska last November:

▶ Banks are becoming aware that capital is the limiting factor in improving farms in this country.

▶ Budget type loans, under which farmers would be able to draw and repay on a line of credit (similar to what other credit agencies are doing) came in for serious discussion.

▶ There is growing cooperation between the country bank and the correspondent bank, because of the limits of the small bank's lending ability.

▶ Staffing of farm loan departments of correspondent banks with agriculturally-trained men is growing.

Farmer-banker relations should be considered objectively. The farmer has a reputation for being reluctant toward the banker—many times to his own detriment. But his reluctance is well justified, in many cases, when it comes to consulting the banker on fertilizer problems.

William E. McGuirk, Jr., president of Davison Chemical Company, told members of the American Bankers Association last November at their National Agricultural Credit Conference:

"I have a theory as to why farmers seldom think of or consult bankers in connection with fertilizer matters (See NPFI Study report, "Farmers Attitudes Toward the Use of Fertilizer," March 1958 FARM CHEMICALS).

I believe that bankers, like many other persons, overestimated the complexity of determining the proper types and kinds of fertilizer to be used."

Consequently, McGuirk deduced, bankers have often shied away from advising farmers on fertilizer.

"Contrary to a widespread opinion, it is not difficult for the layman to obtain a reasonably good determination of the proper kinds and types of fertilizer to be used in most cases."

GUIDES ARE AVAILABLE

Fact of the matter is that in most areas of the country, the state colleges of agriculture will provide simple guides to fertilizer usage, which, if followed, would greatly improve the fertilizer practices of most farmers.

Let's see how you can get bankers interested in extending more credit for fertilizer.

McGuirk brought out that "even forgetting the important moral issues involved, if we . . approach the question of fertility maintenance from the point of view of *enlightened economic selfishness*, a little thought will bring us to a rather obvious and salutary conclusion."

Every manufacturer has supporting evidence to show bankers regarding these three well known theories:

▶ Variation in yield per acre affects unit cost of production.

▶ Increase in yield per acre affects profits in two ways—by *increasing profit per unit* and by *increasing the number of units per acre.*

▶ Under average management conditions, increases in the use of the right kinds of fertilizer will usually affect yields, unit costs and profits more favorably than any other management factor.

Conversely, reduction in fertilizer expenditures on a moderately well-managed farm will usually reduce profits per acre more than the reduction of most other inputs.

There are exceptions, such as the use of necessary pesticides on certain crops, McGuirk explained, but in general these principles stand.

A COURSE OF ACTION

How should we pull all the facts together so that they indicate a *course of action* to bankers? McGuirk said he understood that modern agricultural credit practice calls for making loans on a *total budget plan* which takes into account all income and outgo.

"Since fertilizer can exert such a drastic effect on income, since it frequently is the most profitable single input in the farm enterprise, and since it is not difficult to

MY FERTILIZER SALES INCREASED 55%

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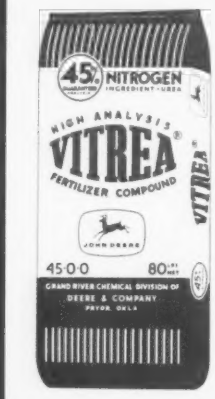

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CREDIT FOR FERTILIZER

(Continued from page 23)

determine with a reasonable degree of accuracy the most profitable rates of fertilizer usage, fertilizer should never be ignored in any farm plan or farm budget," he added.

So you've sold the banker on the value of fertilizer in the total farm plan — WHAT COMES NEXT?

Any smart banker should *know* without being told. Here are just a few steps he might want to take:

1) Help get latest research information to farmers concerning what increased use of fertilizer will mean to increased profits.

2) Employ a special FR (farm representative) to work on farm loans.

3) Hold special fertilizer conferences for farmers, using outstanding authorities on the program.

4) Get behind such worthwhile programs as soil testing, supplying farmer-clients soil testing tubes on loan basis—as well as other materials which can be obtained through the National Plant Food Institute.

5) Make his bank "headquarters" for all information available, such as production potentials, proper fertilizer use, etc.

6) "Plug" soil testing, proper fertilizer usage etc. in newspaper advertising.

That this type of service program pays off in increased loans, increased farm deposits and new customers is evident in the outstanding bank program discussed in the companion article which follows on the next page.

Programs like this will help speed the day envisaged by Gordon B. Nash, professor of agricultural economics, University of Missouri, who predicted recently:

"Sooner or later this mental blind spot in regard to plant food use will disappear, and farmers will use ferilizer as businessmen use other factors of production—they will apply fertilizer up to the amount that the last increment returns its cost plus the going interest rate.

"Then fertilizer use will be perhaps 6 to 10 times the piddling little 50 lbs. of fertilizer containing 13 lbs. of plant food now used on the average acre of crop and pasture land in the U. S." ▲

"THE BEST THING I EVER DID FOR MY FARM CUSTOMERS"

A banker explains a unique service

By **HARRY E. RASH**

WITHOUT A DOUBT the best thing that I ever did for my bank's farm customers during the many years that I have been president of this bank, is the bank-sponsored annual fertilizer conference, started in 1952.

The idea for the fertilizer conference came as I realized the need for helping our farm customers increase their production in order to compete in the changing economy.

Dr. Harold Myers, department of agronomy, Kansas State College, and now dean of agriculture at the University of Arizona, had been calling at our bank when he was visiting our Thayer Experiment Field. He kept reminding me that it was possible to raise crops in our area comparable to those raised in any part of Kansas, even though our soils generally lacked fertility.

"Adequate rates of fertilizer is the most important factor in attaining these top yields," said Myers. In 1948 we had 70 bushel per acre wheat yield from plots just north of Thayer. At the same time, the average wheat yield in Neosho county was 12 bushel per acre. Here was a demonstration of what could be done with high fertilizer application and it was both possible and profitable.

In 1951, Myers invited me to attend the Fertilizer Conference held at Kansas State College where I learned more of the importance of the work being done at the experiment fields.

It seemed to me that the information which was available to the farmers and to the community was not reaching them. There seemed to be a lack of communication between the college and the farmer. I proposed the idea of a Fertilizer Conference on our local level to Myers and Dr. Floyd Smith. They responded wholeheartedly and promised their full support.

I made arrangements for our first Fertilizer Conference in February, 1952. It was held in a basement with an attendance of about 50 farmers. Smith and Floyd Davidson, superintendent of Thayer Experiment Fields, were the speakers on our program. They explained the results of fertilizer experiments on the fields and in demonstration plots of previous years.

QUESTION AND ANSWER SESSION

This was followed by a question and answer period which was stimulating and showed that the farmers present were wanting to know more about fertilizer. We held our 7th Annual Fertilizer Conference in February of this year. We had to move to our school gym four years ago in order to have adequate facilities.

Our only expense has been newspaper advertising, direct mail advertising, and providing a meeting place and refreshments (coffee and doughnuts). We have had full cooperation of Kansas State College and superintendents of Thayer Experiment Field and Mound Valley Branch Station. We have also had several nationally-recognized fertilizer experts present the latest developments in their field.

We have learned at these fertilizer conferences that

Harry E. Rash (left), president of the First National Bank, Thayer, Kansas, goes over a farmer's program with Galen F. Morley, former farm representative (FR) of the bank. Morley is now agricultural representative of a bank in Kansas City.

BANK PRESIDENT EXPLAINS . . .

(Continued from page 25)

if the message is to be effective, it must be seen as well as heard. As an example, in 1957 Dr. Proctor Gull, Spencer Chemical Co. agronomist and Arlan Woltemath, at the time agronomist with Spencer and now with the National Plant Food Institute, were featured speakers on our program. They used a flannelgraph to give a graphic illustration showing "*three dollars* additional net profit for *every dollar* invested in fertilizer." They demonstrated that adequate fertilizer greatly increased the net profit, *and that is what we are all interested in increasing.*

Our aim in these fertilizer conferences has been to help bring to our local farmer the latest available research information, in a manner which is both interesting and practical. A world of information is available, but it still does not reach down to the local level to motivate the farmer and his banker.

Neosho county average wheat yields have gone from 12 bushel per acre to over 30 bushel per acre in last few years. Before our educational program became effective, our farmers used only small amounts of fertilizer. Neosho county has since increased its use of fertilizer until it became the largest user in the state in 1956. In 1957 Neosho county was second by only a few tons to Labette county, which is our neighboring county on the south.

In order to help meet the change in agriculture we hired the first "Farm Representative" in our area in 1954. His goal was to help our farmer customers plan a profitable operating program based on sound management practices. This meant a review of their present program and assets, setting up objectives and goals and then developing a program to fit them.

We regarded a sound fertilizer program as the key to maximum crop production and an increase in net income, factors which are so important to a successful operation. The intimate knowledge of our farmer customers' operation that came to us as a result of our farm representative's work enabled us to do a much more intelligent and constructive job of meeting their credit needs than would otherwise have been possible.

BANK LOAN VOLUME INCREASES

Our customer felt he could talk to us about his needs because we would understand them. Our customer would talk to us about a fertilizer loan with the knowledge that we understood his needs and thereby was not afraid to ask for the amount of credit necessary to properly fertilize his crops.

There has been a profitable response for our bank from our farm program which started with our fertilizer conferences. We have seen our agricultural loan volume increase by 33 per cent along with an increase in deposits of 10 per cent. This meant an increase in earnings and net profit for the bank.

A considerable portion of this increased volume consisted of loans to new customers who were attracted to the bank by the added service possible by the addition of our farm representative program.

We are constantly reminded that our Fertilizer Conference and our Farm Representative create confidence and good will. Who can put a value on the good will created by a service such as this? ▲

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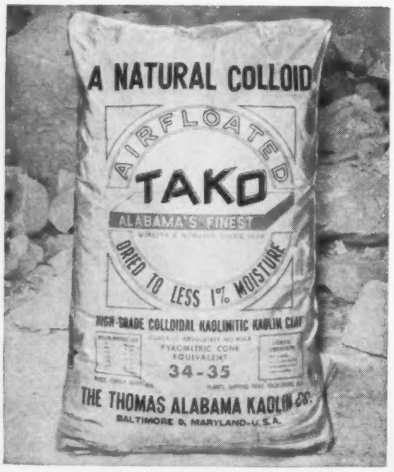

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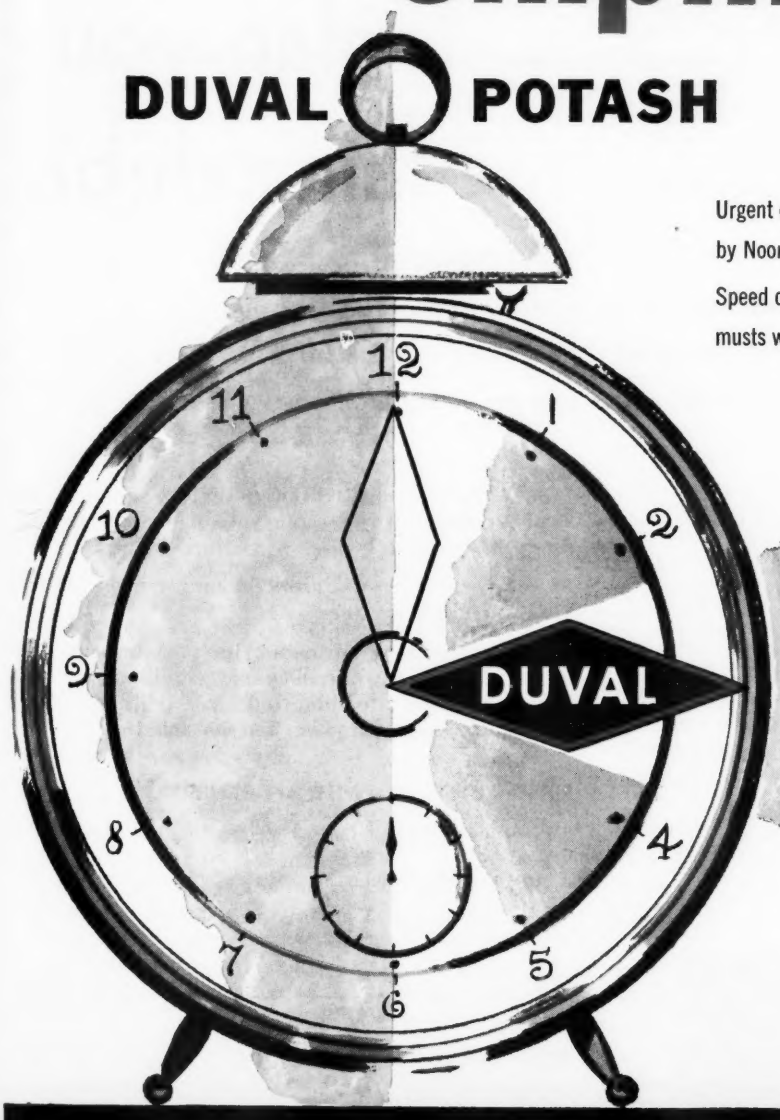

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NOW . . . is the time to plan your fair exhibit

One of the best methods of motivating farmers to see your message is exhibiting at your county or state fair. Here are some exhibit ideas and an estimate of costs.

A RECENT ISSUE of *Agrisearch*, published by the National Project in Agricultural Communications, discussed a "new kind of research"—Motivation.

A story was told of two psychiatrists who met on the street.

"Good morning—how are you?" says one.

Walking away, the other thinks to himself, "Hmmm, I wonder what he meant by that?"

Agrisearch reported that "in a real sense, motivation research—or M. R. as it is called—is concerned with hidden meanings of this kind. It looks for the 'real' causes of human behaviour."

In effect, what does a *good county or state fair exhibit* do but *shout* in a very friendly manner: "Good morning, how are you?"

An exhibit is an attention getter. Use it as you would your *voice* if you were trying to stop a passerby. An example would be:

"Hey, Joe, Farm Bureau meeting tonight—8:30 sharp—we're electing officers."

Notice what you did to gain Joe's attention? You raised your voice, you spoke *directly* to him, you told him what you wanted him to do, you told him about something *important* to him, and you told him *quickly.*

FIRST QUESTION—WHY AN EXHIBIT?

There are several reasons why you might want to use an exhibit. *First*, it is an attention getter. *Second*, it reaches people who do not read circulars, listen to

Photo Courtesy of General Exhibits, Philadelphia

HOW MUCH WILL AN EXHIBIT COST?

$50-$100	$150-$300	$350-$600	$650 ON UP
Simple table-top units, carried in a brief case to portable displays which fit in most automobiles and can be erected by one man within minutes.	Compact, attractive, easy to assemble. Header with simple lettering. Ample room to attach literature and demonstration material.	Type of material governs cost. Plain white pine-painted, plain wooden supports etc. are less expensive than walnut paneling or birch with unistrut supports.	Adding considerably to costs would be special art work, colors etc. such as to show distribution areas etc., lights, motion units etc. They are effective and worth the money.

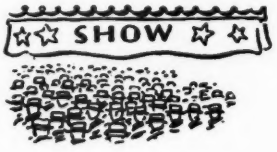
[The above information was supplied by General Exhibits, 1600 South Bambey St., Philadelphia 45, Pa.

the radio, or show up at meetings. *Third*, it has a dramatic impact through the use of color, pictures, and scope to which we humans respond. *Fourth*, it is a time saver. The viewer can learn something in a few moments. *Last*, it is sometimes a way of helping people to learn and to remember by pushing buttons, opening boxes or pulling levers. The latter type, of course, would be the audience participation type of an exhibit which is very valuable.

Whatever the occasion or your motivation, *it is easy to get bogged down into a maze of blue prints, cut outs, color schemes, models, etc. When this happens, the means becomes so intricate that the end disappears from view.*

But, if what you want to say can be expressed visually and dramatically with a few simple words; if the spot for the exhibit is where you will get most of the people you want to reach; if you can have plenty of assistance; and if your budget will permit you to spend some money—then roll up your sleeves and let's get started with plans for an exhibit.

Your goal is to get the right message to the right people in the most direct and effective manner. For



instance, at your county fair, the patrons will be mostly rural people, so consider their interests—their children, their farms, their crops, their homes, and improvements they may want to make.

Decide what you have to offer in *helping the people with these interests.* For instance, an exhibit could help them select fertilizer, kill pests, select adaptable varieties of crops, present management aids, and many others.

After you have selected the subject matter for the exhibit *select your message.*

You get the idea of "raising your voice" in an exhibit by building your exhibit on a clear cut, simple plan using 1) bright colors, 2) strong lines and the 3) fewest possible number of elements.

Most exhibits suffer from an overdose of toos—too many figures; too many facts; too many colors; too much copy; too many models; or in other words, too many elements.

After you have selected your message, you are ready to begin with the "how to" to express your message. Make a check list of your resources.

1) Can you do something? With the demonstration material that you have available, your range in this respect is limitless.

2) Have you objects to display?

3) Have you models to show? Models would include fields, dairy barns, tractors, etc.

4) Would photographs be effective? You might be able to use photo obtained from a county agent, vo-ag teacher, or a state college agronomist or other specialist taken during a demonstration or field trip—or you may have photos that have been taken by a "photo bug" on your staff or a local photographer. Photos can make an effective exhibit if they tell your message.

5) What service can you command? The exhibit that you build will depend on whether you can get the job by a professional exhibit company. If not you will need the necessary carpentry work, art work, lettering, photography, etc. Most exhibitors have found out that it pays to "go first class" all the way.

At a county fair or other rural gathering, you can assume that your audience has come to see. *These folks will stop more readily, stay with you longer, and view your display at closer range. But you still have the competition of merry-go-rounds, ferris wheels, etc. So your exhibit has to be eye-catching.*

There are a number of mechanical factors you should go over before you begin work on your booth: Find out in advance what type of a booth it is (curtain, walled, or open-spaced); the dimensions; the outlets; fire regulations (this is very important); color and texture of background; the theme of the event and something about your neighboring booths.

DEVELOP A SCALE MODEL

After you have this information at hand, build a scale model of your booth then fill in the elements in the scale model. Making a scale model may seem like paper doll work, but it is very important in setting up a good exhibit.

A scale model will help you see where you are crowding; where you are confusing separate elements; and where the focal point or "hot spot" of your space will be.

People don't look above eye level and they are accustomed to reading from left to right. So, keep your material up on risers and see that your material moves from left to right.

Risers can be made from empty boxes, nail kegs, square boxes or any such objects to get your material up off the floor and up to within seeing distance. Even if your display may be on a card table top, the material still should be up on risers. All items not immediately self-explanatory should be labeled.

When planning an exhibit, keep in mind that it is for people and that people have eyes in their heads and not in their stomachs.

Too many exhibits have objects displayed at table top height or below. The patron or visitor to your display or exhibit must bend or crouch over or change from reading to distance glasses in order to take it all in; and, of course, the average person won't go to that bother.

Eye level is about 5'3" above the floor for most people. Pictures and small objects should not be placed higher than 7' 3" or lower than 3' above the floor. Objects at 3' would be low. That is where your small risers would help your exhibit or display.

If your booth is large and deep, you will find you will have a better looking display or exhibit if you cut down the depth by using screens. Move your exhibit up toward the front so that the patrons or spectators can see your exhibit. A large area cut down to a small area is much easier to exhibit in and it makes a better-looking exhibit. There is less danger of crowding.

Most spectators will spend ten minutes at a demonstration exhibit at county or state fairs. If you use live demonstrations, have them timed carefully to fit into that amount of time, still leaving a margin of minutes for questions. ▲

Specialized knowledge, unknowns and personal interests lead to "widely divergent" views of solutions to

PESTICIDE PROBLEMS

As a sequel to last month's report on current opinions of pesticides' threat to wildlife, here are excerpts from a paper read at the March meeting of the National Wildlife Federation.

The author: Dr. Malcolm M. Hargraves of the Mayo Clinic.

Half-truths and hysterical crusades, he says, cloud the issue. He stresses the potential and known hazards to human health from multiple exposure to petroleum distillates—not the toxic chemicals they carry.

THE "PROBLEM" OF pesticides has generated considerable heat in the last few years, and this largely stems from the unknown effect as yet upon humans, animal, aquatic and other biological values.

The difficulty has largely arisen because each of us is viewing the "problem" from his own particular sphere of personal interest and specialized knowledge. This understandable situation has given rise to widely divergent views which have never correlated with the views of those working in different spheres and having different experience.

Actually, I doubt that any of us is completely aware of the real magnitude of the problem, particularly when we use the term "pesticide." The shorter Oxford English Dictionary defines pest as, first, "any deadly epidemic disease or pestilence," or second, as "any thing or person that is noxious, destructive and troublesome." It is of interest that the term pesticide is not yet included in this all inclusive dictionary printed 25 years ago and therefore must be of recent origin.

Since the suffix "-cide" means to cut or kill, the term pesticide could be of the magnitude of your interpretation of what constitutes a pest. I believe that the present concept of a pesticide, however, is a lethal agent employed to destroy noxious insects and plants. Since the term noxious is also subject to individual interpretation, the problem grows in complexity.

When one also realizes that the, as yet, relatively non-specific pesticides in use today cannot discriminate between noxious and beneficial, the problem is further confounded. It is of little wonder that it becomes heated when the judgment of the one applying the pesticide must also be questioned as to his ability to so discriminate.

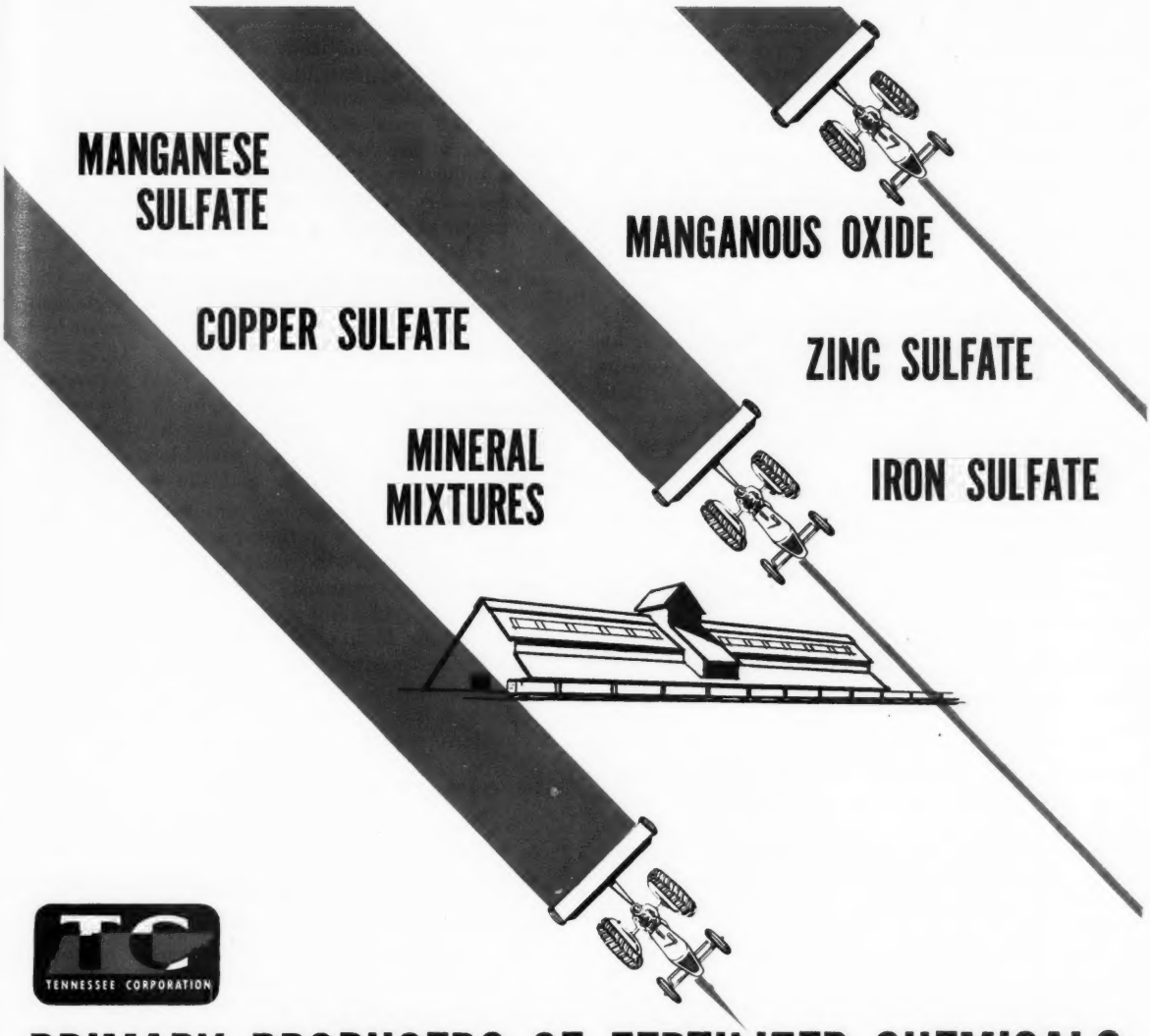
THE MORE ABUNDANT, FULLER LIFE

Before proceeding further, I believe that a scrutiny of the objectives of pesticides is in order. Simply stated, perhaps we could agree that our objective in pesticide use is that of providing a more abundant and a fuller life for the majority of involved people by controlling and a'tering the environment of our habitat.

Here, of course, there will be a wide divergence of opinion as to what constitutes a more abundant and a fuller life. However, I doubt that even in a group of this sort, (National Wildlife Federation) dedicated as it is to the preservation of desirable natural environmental values, that there are many who would exchange their present day living standard for that of their prehistoric, cave dwelling ancestors.

The problem of future change then becomes relative both as to the means to be employed and the ends to be achieved. However, the past is an accomplished fact and everything that our ancestors did that was considered an advancement to the more abundant life was accomplished by the use of newly developed tools to alter the environment of their habitat. An often neglected or unrecognized corallary of this statement is that our ancestors were able to adjust to those environmental changes of their habitat. Conversely, and it would seem obvious without saying it, those who could not adjust perished and did not transmit their hereditary make-up to that of the surviving population. In other words, this was the survival of the fittest to adjust to the new environment of the habitat. That fact is still true today and, is of necessity, the crux of my thesis. If then, you will agree with me that there are certain inherent risks in manipulating our habitat environment by means of new tools, I believe that we could summarize those associated with pesticide use as follows:

▶ There is a loss of certain existing environmental values and ecological relationships which are displaced by the resulting new ones, and only time and readjust-



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ment will prove which we may need for our survival.

▶ There is an acquired responsibility to maintain constant surveillance or policing protection of the resulting environment since the introduction of the pesticide must now be a constant operating check in the new ecological balance established by its use.

▶ There is a health hazard to existing individuals in the habitat both from the effect of actual personal contact with the agent and from the need for habitat readjustment.

THE HEALTH HAZARD

Actually, because of ecological implications of each three risks they can be scarcely separated, even for discussion's sake. However, I will attempt to enlarge upon risk number 3—that is, the health hazards of the jeopardy to survival experienced by the individual member of a population subjected to pesticide exposure.

Before any such effort can be made it is necessary to attempt to clarify or define many terms or circumstances relating to cause and effect. I hope by this course to bring as much of the picture into focus as possible and avoid as best we can the half-truths which can enter such a controversial discussion. There are enough half-truths as it is, even when we marshall all of the scientific evidence which we have available, and half-truths can lead to individual panic and mass hysteria.

There is a need to avoid supplying any more ammunition than possible to the ever present paranoid, but still mentally compensated, crank who is back of many of the hysterical crusades which periodically emerge in every period of civilization. While such an individual may serve a purpose, he can still cloud an issue in need of solution for the common good.

Because I believe that the following concepts are either based upon established facts or clinical evidence hard to deny, I present them for your consideration.

1) Pesticide agents may be of many types such as the inorganic elements of arsenic, lead, sulfur and mercury, of the various plant glucosides such as strychinine, curare and digitalis, or bacterial by-products such as dicoumarin. The toxicological effects of these agents are well known and will not be discussed.

The pesticide of today's discussion is the hydrocarbon, both aliphatic and aromatic, and its modified chloro, brome and nitre forms as well as the saturated and unsaturated and cyclic chain compounds. In fact, the multitude of possible chemical combinations is almost beyond imagination and the pesticides of the future potentially would seem to hold promise of great specificity of action putting tremendous power of selective destruction in the hands of the user.

2) It may come as a surprise to many to find out that petroleum and the petroleum distillates are the most commonly used, as well as the oldest pesticides of the day. While petroleum, asphalt and tar have been used for centuries it was only about 100 years ago that kerosene or "coal-oil" was combined with soap as an emulsifying agent and used as a pesticide, especially for the control of the various mites, scales and other pests that damage fruit trees, shrubs and bushes.

The implications of this statement are tremendous from a medical point of view since this categorically puts our gasoline, fuel oils, cleaning fluids, lubricants, solvents and a multitude of other petroleum agents into the class of pesticides whether we like it or not.

Consequently, when we begin to look to "pesticides" and their effect upon human health you can see that we are surrounded by potential hazards and it is difficult to differentiate between the multiple exposures as to which might be responsible for any particular pathogenic state.

3) The problem of multiple exposure is inherent in petroleum and its distillation products. It has been shown by careful distillation of a single sample from one oil well that more than 200 different hydrocarbons are present in that sample. It is further recognized that no two oil wells yield a product of the same composition and that many crude oils are rich in the aromatic hydrocarbons, that is, the benzol series notorious in producing such blood dyscrasias as aplastic anemia, leukemia and the lymphomas.

The problem is further complicated by today's refinery change-over to thermal cracking and reforming and more lately to catalytic cracking and reforming which tremendously increases the percentage of aromatic, cyclic and unsaturated compounds. This gives us our high octane fuels, fuel oils, solvents, thinners and multiple basic compounds for a rapidly spreading petro-chemical industry to purify and fabricate into innumerable new products which contribute to today's more "abundant life."

IMPORTANCE OF THE "VEHICLE"

4) When we speak of a pesticide we seldom refer to a single purpose compound such as DDT, chlordane, lindane, dieldrin, 2,4-D or others. The next time that you look at an insecticidal aerosol or can of fly spray I suggest that you read the label. Not only will you find there is a 2 to 5 per cent of one or more of the chlorinated hydrocarbons but that they are suspended in 10 to 14 per cent of "petroleum distillate" together with some suspending or dispersing agent. In the can of bulk spray the "petroleum distillate" may be 99+ per cent with a repellent such as pyrethrins added.

It is possible that the aromatic, cyclic and unsaturated hydrocarbons of the "vehicle" may be more important as a toxic agent when inhaled by the human bystander than the DDT or other agent that is being suspected of mischief.

We forget, for example, that in the so-called gypsy moth program one pound of DDT is suspended in 1 gallon of petroleum distillate (lightly glossed over as "1 gallon of light oil") to which is added 1 quart of zylene which is dimethyl benzene.

5) In spite of toxicological work with animals, it is still entirely possible that aromatic hydrocarbons (commercial zylene, when added to a pesticide) may be a potent cytotoxic agent to hypersensitive humans.

6) When dealing with poison of this sort, we think quantitatively. Laymen think quantitatively when they say, "There was enough there to kill a horse!"

It is the susceptible or hypersensitive individual who runs the greatest risk of reacting adversely to various hydrocarbons. It has long been known that chronic intoxication by benzol will produce anemia, lymphomas and leukemia in certain susceptible individuals. ▲

INTERNATIONAL'S
FULL ORBIT
SERVICE

Setting New Standards of Quality Control

CHECK OUT COUNTER THAT KEEPS TAB ON

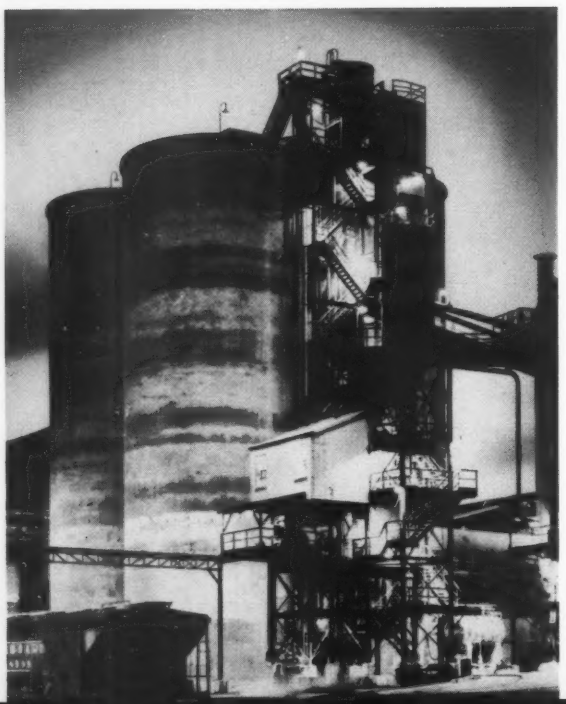
TRIPLE SUPER

Quality

International MINERALS CHEMICALS

Quality of product carries a lot of weight with manufacturers who buy fertilizer materials. That's why

International ch quality from Bo



Over 40 separate tests, more than 400 chemical analyses daily help produce a uniformly superior Triple Superphosphate that's conditioned for trouble-free shipping

Product quality rates high with users who stay with International's Triple Superphosphate. The right combination of chemical and physical characteristics means a uniform product that holds caking problems during shipping and storing to a

STORAGE — Triple superphosphate (granular, run-of-pile, coarse) is stored and cured in a 90,000 ton warehouse for a minimum of 5 weeks to assure desirable chemical and handling characteristics . . . maximum plant food availability.

PLANT FOOD MANUFACTURER — Final control check . . . 6 quality tests made as triple superphosphate is loaded for shipment.

checks out Triple Super Bonnie right to your plant

minimum. Easier handling and superior ammoniating qualities result.

Much of the credit goes to the technical task force that guards the quality of International's Triple Super. For testing is a round-the-clock operation at Bonnie, Florida. Testing follows every phase of processing . . . starting at the mine and climaxing in a rigid final checkout that each shipment must pass before it can load and go.

After International's Triple Super has been processed into three grades — granular, run-of-pile, coarse — it is stored and cured in a 90,000 ton warehouse for a minimum of 5 weeks. This produces the finest chemical and handling characteristics . . . maximum plant food availability. Then comes the final checkout: six quality control tests made *as triple is loaded for shipment!*

Painstaking? You bet it is! And worth every bit of the extra effort in terms of your confidence that every shipment of International's Triple Super is as high in quality as today's finest processing can make it.

With triple ready to roll, International service takes over. There's shipping — by rail, barge, ship — whichever method keeps your costs lowest. You benefit from service that's tailor-made for your own plant — delivery by river barge . . . on-site storage at key transportation centers . . . rolling warehouse shipments. That's why International's services can't be matched by any other supplier.

And there's International's staff of experts, ready to help on formulation and equipment problems . . . designing plant layouts . . . streamlining materials handling — *at no cost to you!*

To sum it up — you profit when you depend on International's Triple Super.

COARSE — International's coarse-textured Triple gives you the same excellent ammoniation batch after batch . . . promotes desirable agglomeration.

GRANULAR—International's granular Triple is non-crumbling, free-flowing, makes granulation easier. Sponge-like structure of granules facilitates ammoniation.

RUN-OF-PILE — International's fine-textured Triple provides uniform particle size, even density and proper moisture level that lets you ammoniate at higher rates, temperatures.

TRIPLE SUPERPHOSPHATE

Available P_2O_5 (min. guarantee) — 46.0%

Particle size:

	R.O.P.	GRANULAR	COARSE
—6 mesh	98-100%	97% min.	97%
—65 mesh	22-34%	0.5% max.	3%

International's quality "check-out" helps you get full value from your phosphate dollar

A complete line of triple superphosphates and phosphoric acid solves formulation problems

Now you can make International your dependable single source of all high-analysis phosphate ingredients. Benefit from International's three grades of top-quality triple superphosphate plus high purity 53%-55% phosphoric acid. Get all the quality advantages International's processing adds to your product. Be sure with International.

INTERNATIONAL'S FULL ORBIT SERVICE

MINERALS International CHEMICALS

Creators of Living Minerals

SPECIAL PRODUCTS DEPT., PHOSPHATE DIVISION

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

Administrative Center: Skokie, Illinois

READER SERVICE

FREE INFORMATION to help you solve fertilizer, pesticide problems

Chemicals

109—M&C ATTACOTE

Producers of fertilizers and other hygroscopic or sticky industrial chemicals will be interested in Attacote, its new fine particle size, sorptive Attapulgus Clay product, reports Minerals & Chemical Corp. of America. It can be used for coating prilled, granular and explosives grade ammonium nitrate; ammonium sulfate; agricultural grades of urea; granular high analysis fertilizers and such resins as phenol-formaldehyde, the manufacturer says. Inert and non-toxic, Attacote is a magnesium aluminum silicate. Further information may be obtained by

CIRCLING 109 ON SERVICE CARD

110—TREBO-PHOS

Full information on Trebo-Phos triple superphosphate is available from American Cyanamid Co. The material attains high rates of ammoniation—up to 5 per cent—without evolution of ammonia fumes. Although Trebo-Phos achieves maximum and uniform absorption, it will not take on excessive amounts of moisture, according to Cyanamid. For complete information on the material,

CIRCLE 110 ON SERVICE CARD

111—EMULSIFIER FOR AGRICULTURAL TOXICANTS

Information has been released by Nopco Chemical on Agrimul TL. A liquid blend of nonionic and anionic surfactants, it is soluble in water and xylene and dispersible in kerosene. Nopco claims that Agrimul TL gives instant emulsions with almost no creaming or oiling out, even under fairly extreme conditions. For details,

CIRCLE 111 ON SERVICE CARD

112—DIAMOND HERBICIDES

Two folders concisely reviewing Diamond Fence Rider and Crop Rider formulations in handling weed killing and brush control on farms have just been issued by Diamond Alkali Co. Both include ready-reference wall charts covering specific weed and brush control problems, type of herbicide and quantity of solution required and application tips. To get your copies

CIRCLE 112 ON SERVICE CARD

113—FAIRFIELD FOLDER FOR FORMULATORS

Formulations aimed at increasing effectiveness of household, garden and truck crop insecticides against resistant insects are offered in a new free folder, "House & Garden Sprays & Dusts" prepared by Fairfield Chemicals, Food Machinery and Chemical Corp. Especially prepared for the insecticide formulator and packager, the folder lists suggested formulations for dual purpose home and garden sprays, horticultural sprays, fungicide additives, emulsifiable garden sprays and concentrates, and garden and truck crop dusts. Key to effectiveness of the formulations listed is Pyrenone, a combination of pyrethrins and piperonyl butoxide, Fairfield reports. Copies of the folder can be obtained by

CIRCLING 113 ON SERVICE CARD

114—CELITE BROCHURE

Johns-Manville has released a brochure describing the ability of Celite to coat a granule or prill of fertilizer. A diatomaceous silica product, Diatomite is a fluffy, inert powder composed of finely divided particles with high surface area. Particularly important in explaining Celite's efficiency as an anti-caking agent, says J-M, are its loose weight density (less than 10 pounds per cubic ft) and its high liquid absorption (200 per cent). For a copy of the brochure,

CIRCLE 114 ON SERVICE CARD

115—CALCIUM ARSENATE GRANULAR

General Chemical Div., Allied Chemical Corp. has available granular calcium arsenate for formulating and packaging pre-emergence crabgrass control products. The material is reported to be effective for killing germinating crabgrass seeds and seedlings and also for control of *Poa annua* (annual bluegrass) and chickweed. For complete information

CIRCLE 115 ON SERVICE CARD

116—DU PONT UAL-S

Two efficient forms of nitrogen are combined with ammonium sulfate in DuPont's UAL-S, the company reports. UAL-S is said to be non-corrosive to fertilizer manufacturing equipment, and it's safe—handles at moderate pressure, and there's no danger of flash fires. Regular mixtures cure well with UAL-S, are free flowing and resist caking, while in granular mixtures, UAL-S helps produce good yields of hard, round, firm granules that store and distribute well, DuPont says. They have complete information on the solution available.

CIRCLE 116 ON SERVICE CARD

Process Equipment

117—AUTOMATIC METERING PUMP

An automatic metering pump that adjusts pumping rate from zero to full capacity by signals from pneumatic instruments has been announced by the Process Equipment Div., Lapp Insulator Co., Inc. Called the Auto-Pneumatic Micro-flo Pulsafeeder, the pump is available in a variety of models. Theoretical capacity ranges from 1040 to 2300 ml./hr at O psig. Pressures up to 2,000 psig can be accommodated. The company says this pump is "designed to give the process industries a means of automatically metering chemicals without using constant level controls, high head tanks, measuring tanks or stuffing box pumps. "Further information can be had by

CIRCLING 117 ON SERVICE CARD

118—DEMING PUMPS

Deming Fig. 1537 rotary pumps are designed for tank truck mounting and for handling viscous liquids. They also are used for solvents, oils, non-viscous liquids such as anhydrous ammonia and naphtha and liquids with vapor in suspension, says The Deming Co. The new bulletin covers features of construction, sizes and ratings, motor hp tables, dimensions and a complete list of materials used in construction of the pumps. For your copy

CIRCLE 118 ON SERVICE CARD

119—VERTICAL GEARMOTORS

Addition of vertical gearmotors to its line has been announced by Lima Electric Motor Co., Inc. These new units are available with either flanged mounting face or with standard vertical extended housing. They are supplied in double or triple reduction units with Duti-Rated Lifetime gearing, in ratings from 1 to 75 hp, with reductions from 350 to 7½ rpm. For complete information

CIRCLE 119 ON SERVICE CARD

120—JOY COMPRESSORS

A new bulletin offering information on WGO-9 oil-free compressors has been published by Joy Mfg. Co. The bulletin's 12 pages provide pertinent data on 14 sizes of heavy duty industrial compressors ranging from 95.6 to 939 cfm. Included are section drawings, installation photos and a special section on the "T-Block" design compression ring. We'll see that a copy is mailed to you if you

CIRCLE 120 ON SERVICE CARD

121—D-O PUMP CATALOG

Five new two-color equipment bulletins have been bound in a single catalog

how to use the READER SERVICE CARD

- *Circle number of literature you want*
- *Print or type your name, position, company and address*
- *Clip and mail the Service Card*

entitled "Dorr-Oliver Pumps for Hot or Cold Corrosive and Slurry Service" and are now available to readers. Containing 22 pages, the catalog describes the complete D-O pump line for chemical process and allied industries. Inlcuded are line and wash drawings, photographs, specification and performance data and parts lists. To get your copy

CIRCLE 121 ON SERVICE CARD

122—ENCLOSURES FOR VIBRATING SCREENS

Dust-tight enclosures for floor-mounted single, double and triple deck Ripl-Flo vibrating screens are described in new literature released by Allis-Chalmers. Designed to solve air pollution problems, the heavy-duty enclosure keeps dust contained, A-C reports, while also permitting easy access to screening equipment. Its construction is illustrated in a leaflet, available by

CIRCLING 122 ON SERVICE CARD

123—I&C OSCILLATING SCREEN DATA

Specifications of the I&C oscillating screen are included in a four-page booklet from Inglett & Co., Inc. Its motor can be mounted on the outside of the frame, providing an unobstructed 45" x 80½" hopper opening. Oscillation of the screen tray produces an eliptical motion through a vertical plane tilted toward the upper end of the screen. Degree of oscillation can be readily controlled by adjustment of the eccentric oscillator units at each end of the shaft. For your copy of the booklet,

CIRCLE 123 ON SERVICE CARD

124—JET-O-MIZERS AND JET-O-CLONES

"Jet-o-mizers" and "Jet-o-clones" are described in a new bulletin from Fluid Energy Processing & Equipment Co. The Jet-o-mizer is a heatless, motionless mill, reported able to prepare pesticides and fungicides in concentrates, field strength wettable powders and dusts, using BHC, chlordane, DDT, dieldrin, heptachlor and similar organic toxicants. For the new bulletin,

CIRCLE 124 ON SERVICE CARD

Packaging

125—SIDE HANDLES

Double side handles on Hudson multiwalls provide a big sales "extra" because of their convenience to the end user, reports Hudson Pulp & Paper Corp. With the handle, 50 pound loaded multiwall bags are as easy to carry as a suitcase, the manufacturer says, and they can take heavy abuse. For more information,

CIRCLE 125 ON SERVICE CARD

126—FIBRE DRUMS

Bennett Industries now is producing fibre drums under the trade name Speedy-Pak. Four diameters are available: 11¼", 12½", 14" and 15½", with capacities ranging from 2 gallons to 26 gallons. Net weight packing range is 60, 115, 150 and 225 pounds for dry and solid articles. Sidewalls are of Fourdrinier Kraft linerboard, ends of cold rolled steel with a baked-on protective coating of sanitary varnish. Unique features are reported to be vertical stacking, with a protective flange bottom area. Data sheets covering a full list of sizes are available. Just

CIRCLE 126 ON SERVICE CARD

See pages 58 and 59 for information on these Reader Service numbers:

136—Band Treatment Model
137—"Hi-Stacker" Can
138—Way-Matic Bagger
139—Hypro Sprayer Pump
140—Stereo-Microscope

Materials Handling

127—WEIGH-FEEDER

A new weigh-feeder for electronically controlled feeding of dry chemicals and other bulk materials in processing operations has been announced by Syntron Co. It is said to provide reliable continuous volume feeding at any rate between 3 and 300 pounds per hour. The unit, consisting of the hopper with its vibrator, the vibrating feeder, and the weighing, recording and control components, are completely contained within a dust-tight sheet metal cabinet. Literature is available. Just

CIRCLE 127 ON SERVICE CARD

Application Equipment

128—BAUGHMAN SPREADER

An illustrated bulletin is available from Baughman Manufacturing Co. on its Twin Distributor K-5 lime and fertilizer spreader. Its lube-impregnated chain drive insures greater corrosion resistance and virtually eliminates chain "freezing," according to Baughman. For detailed information,

CIRCLE 128 ON SERVICE CARD

129—BULK FERTILIZATION BOOKLET AVAILABLE

"Your Land Is Different," a handy, 12 page booklet is available to spreader operators from Highway Equipment Co. It contains tips on soil testing, liming, proper fertilizer application and effective spreading patterns. For your copy

CIRCLE 129 ON SERVICE CARD

130—CALL AIR PLANES

Call Air reports that its agricultural airplanes are designed specifically to meet the needs of the aerial applicator. Two new models are the A-5 (150 hp) and the A-6 (180 hp). To obtain complete information about them,

CIRCLE 130 ON SERVICE CARD

Miscellaneous

131—MOISTURE BALANCE

An improved moisture balance for fast and accurate determinations of moisture content in a wide variety of materials has been announced by Central Scientific Co. Among the materials for which the balance can be used are chemicals, fertilizer and seeds. According to Central Scientific, the balance performs drying and weighing operations simultaneously, thus eliminating time consuming weighing of samples on an analytical balance, with subsequent drying in a vacuum oven and then reweighing. Principal feature of the new model is its built-in autotransformer which regulates voltage automatically. For details,

CIRCLE 131 ON SERVICE CARD

132—SAFETY BOTTLE CARRIER

A bulletin from General Scientific Equipment Co. describes the new Safety Bottle Carrier for handling chemicals in glass containers. Of polyethylene, the carrier has a heavy wire handle sealed in plastisol. In tests, the carrier has withstood hard use for over a year without breakage of a single bottle, the manufacturer reports. Complete information is yours, by

CIRCLING 132 ON SERVICE CARD

133—CORROSION RESISTANT COATINGS

A new bulletin from Wisconsin Protective Coating Corp. just off the press charts protective coatings for tank linings and for steel, concrete and wood where corrosive spillage, fumes and atmospheres are present. Text describes a wide range of protective coatings for corrosive conditions and lists technical bulletins covering specific applications. For your copy

CIRCLE 133 ON SERVICE CARD

134—GRAM-ATIC BALANCES

"Fisher Gram-atic Balances" is the title of a new 12 page bulletin from Fischer Scientific. Gram-atic is the tradename for the company's single-pan balances. They eliminate all personal handling of weights, Fisher says. Built-in mechanical weights and the sample are automatically interchanged on the same beam arm to maintain a constant load on the balance. The bulletin includes performance and design data for analytical, multi-purpose, general-purpose and special-purpose balances and pictures and describes accessories. For your copy

CIRCLE 134 ON SERVICE CARD

135— NOZZLE CATALOG

A new 32-page catalog covering Steinen Manufacturing Co.'s complete line of industrial spray nozzles is now available. Well illustrated, the catalog contains complete listings and data on all types of nozzles for industrial spraying applications. Specific data on spray angles, dimensions, types of connections and capacity vs. pressure for standard nozzles presented in simplified selection tables. For your free copy

CIRCLE 135 ON SERVICE CARD

3 MEN DO WORK OF 4, and cut material handling costs 15%

in switch to Michigan Tractor Shovels

By equipping standard 16 cu ft Tractor Shovels with ¾ yd buckets, Growers Fertilizer Co-operative, Lake Alfred, Florida, has cut handling costs 15 per cent.

Growers' problem had been a common one . . . how to put greater efficiency into a system where weighing, mixing, and truck loading all were completely automatic. Only in such Tractor Shovel operations as unloading box cars, storing material, and feeding hoppers could there be much improvement.

With this limitation, plant manager Ed Shores' first thought was to get bigger machines. It was about time to trade in his four old 15 cu ft Tractor Shovels anyhow. But an increase of even one size *range* would keep the Tractor Shovels from readily passing through aisles, box car doors, and among some of the 38 bins (which ranged from 40 to 500 tons in capacity).

Then, a different *make* of Tractor Shovel came to mind. This machine—a 16 cubic ft power shift-torque converter Michigan Model 12B—would help boost production simply by preventing the end-of-shift fatigue that comes from constant clutching and declutching. Too, its extra cubic foot of capacity could up production—though only another 100 lbs or so per load.

That's when the key idea was born. Fertilizer is, after all, a relatively light material—the heaviest Growers Co-op handles weighs 110 lbs per cu ft. Perhaps the Michigan Model 12B could swing a bigger bucket, thought Mr. Shores. How about the standard Clark-built ¾ yarder? Fully heaped, it would carry 2230 lbs—470 lbs (27%) more than could the 16 ft bucket. Yet, its load would be well under rig's lift-and-carry capacity of 3,000 lbs. And its extra width, 4 inches, would cause no maneuverability problems.

A three-day on-the-job trial resulted. Michigan and the ¾ yd bucket performed "with highest honors." Loads weighed out at 2200 lbs or better. Each 40 ton box car was unloaded in about 1½ hours. Feeding the hopper from a stockpile 40 feet away, the 12B delivered 77 tons of fertilizer per 50-minute hour. With the fatigue factor reduced, operator made more runs in a day.

Result . . . the Co-op ordered three new Michigans to replace the four old machines.

Today, the combination of eliminating one Tractor Shovel and getting more production from each machine has provided the company with an over-all cost saving of 15 per cent! Yearly output, with only 12 men, is up to 100,000 tons, 700 grades of fertilizer, per season.

Perhaps the Model 12B Michigan can give you similar economies. Test one in your plant for proof—using the size bucket, 6 to 27 cubic ft, which best fits your material, job conditions, and production needs. Write us to arrange the details.

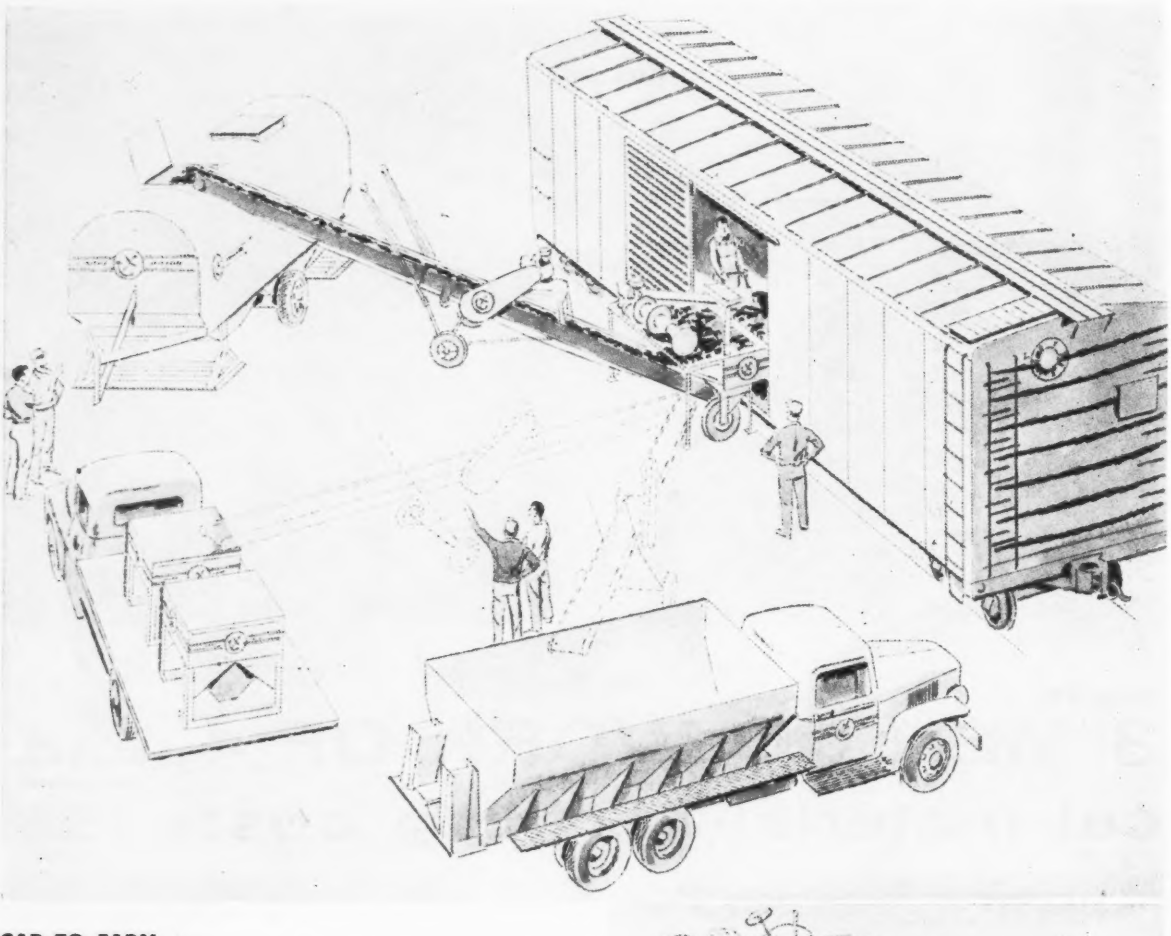
Michigan is a registered trademark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK® EQUIPMENT

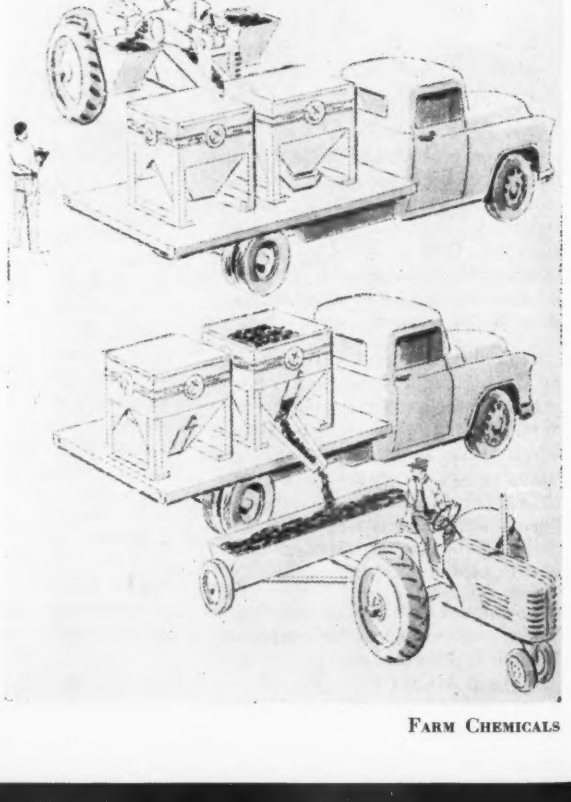
2461 Pipestone Road
Benton Harbor 10, Michigan
In Canada:
Canadian Clark, Ltd.
St. Thomas, Ontario

MATERIALS HANDLING
CUSTOM APPLICATION



CAR TO FARM ▲

The Anchor Custom Service program is built around this flexible bulk handling system, which is reported to reduce railroad demurrage charges, expensive permanent storage facilities and all bag lifting. Fertilizer can be moved by one man from boxcar through portable unloader. Then the large transfer conveyor loads portable storage unit for storage at siding or removal to more central location. Conveyor also can unload portable storage unit in order to move fertilizer to Flo-Bins or truck-mounted spreader.



AT THE FARM ▶

Portable Flo-Bins form convenient storage and handling units. Fertilizer can be moved by gravity delivery or by small transfer conveyor into custom spreader, tractor-mounted spreading equipment or airplane. Wilson & Geo. Meyer says unloading time can be cut by as much as 75 per cent.

SPECIALIZED EQUIPMENT for the dry bulk industry

The farm chemicals field is witnessing the emergence of marketing operations so extensive that they could not function at all, let alone with the required efficiency, were it not for the modern-day handling of materials.

Playing a key *role in the success of these operations are companies which make it their business to design and manufacture specialized fertilizer handling systems.*

Materials handling systems vary tremendously as to their function and size. In general, they are epitomized by an early description which is still apt: "they are systems which keep materials on the move while the men stand still."

While it is true that technicians operating these "tools" in many cases stand—or sit—ingenious men in the marketing organization being served by the handling system are moving at a fast clip to add new dealers. Ingenuity and cooperation like this—between the engineer, producer and distributor—are expanding fertilizer sales volume in this country.

AN EXCELLENT EXAMPLE of how *materials handling* has become one of the most important measures of a company's ability to operate efficiently is the Anchor Custom Service, a relatively new marketing program of Wilson & Geo. Meyer & Co., Los Angeles. This company is the western distributor for Stauffer Chemical Company, New York, and Western Phosphates, Inc., Garfield, Utah, producers of phosphate and ammonium phosphate fertilizer.

The specialized equipment pictured on page 40 "makes" Anchor Service.

THE "HEART" OF THE SERVICE

Wilson & Geo. Meyer refer to bulk handling as the "heart" of the Service, for which growers are willing to pay a fee "because it will buy a better application job than they could do themselves for the same amount of money."

Fabricated Metals, Inc., San Leandro, Calif. well known for its experience in both dry and liquid fertilizer handling systems, designed and manufactured the specific equipment needed for unloading, conveying, storing and applying the fertilizer.

The new approach to the handling of dry phosphate fertilizers makes equipment available to dealers on a lease-purchase arrangement by Fabricated Metals. Total investment runs from $5,000 to $15,000, according to a report in the November 15, 1958 issue of *Chemical Week*, with a "payout period" of two to three years.

FARM CHEMICALS does not intend to discuss the pros and cons of "dry bulk" in this presentation, but rather the unique handling system which requires the services of only one man. Here are the "tools" which perfom the various jobs in bulk handling.

▶ *Portable railroad unloader*, used for unloading quantities of fertilizer from boxcars, flat-bed trucks or permanent storage bins. It takes one man to unload a boxcar of fertilizer in about two hours with this shallow steel hopper on which is mounted a power-shovel winch.

▶ *Large transfer conveyor*, for use with portable railcar unloader in transferring fertilizer from railcar boxcar to portable storage unit, and for transferring fertilizer from portable storage unit to custom spreader or portable "flo-bins." It can move from 50 to 100 tons of fertilizer per hour.

▶ *Portable storage unit* for storing fertilizer at central points after unloading from railroad boxcar. It holds up to 25 tons of fertilizer and "makes any railroad siding or other central location a warehouse point for truck deliveries, according to company promotion.

"DOWN ON THE FARM" EQUIPMENT

▶ *Custom spreader* for application of fertilizer in bulk moves tonnage economically within a ten-mile radius of the point of supply.

▶ *Portable "flo-bins"* for storing application quantities of fertilizer at point of use and for moving fertilizer easily on flat-bed trucks. Standard 3,000-pound units permit flexibility of handling and storing. Bins (on legs) can be easily moved with standard fork-lift trucks. Should a farmer wish to convert to bulk spreading in his own bulk handling operation, these units would be a "natural."

▶ *Small transfer conveyor* for moving fertilizer at or near point of application—that is, from portable flo-bins to custom spreader or into other application equipment. It moves 800–1,000 pounds of fertilizer per minute and can be operated and handled by one man.

This completes the on-the-farm fertilizer storage and handling system. ▲

TECHNICAL REVIEW

PESTICIDE RESEARCH

Among the many papers presented before the Division of Agricultural and Food Chemistry, American Chemical Society in Boston, Mass., April 5-10, were those abstracted here.

Determination of Aldrin, Dieldrin or Endrin in Formulations

T. T. White and G. G. McKinley, Shell Chemical Corp.

Aldrin, dieldrin or endrin formulations can be analyzed by a variety of infrared or chemical methods. The suitability of each method is dependent on the type of formulation.

The chemical determination of aldrin, dieldrin or endrin is complicated by the fact that these pesticides are very stable and react chemically with only a few reagents. In general, the chemical methods are nonspecific but can be done with a minimum of equipment or sample preparation. They include total chlorine methods or colorimetric procedures which are adaptations of the residue methods.

The infrared spectroscopic methods, on the other hand, are specific for the toxicant in question. In most cases, however, the toxicant must be separated from the formulation in order to avoid interferences due to the solvent, emulsifier or diluent. This can be accomplished by solvent extraction or chromatographic means.

Detecting and Measuring Malathion-Derived Materials in Urine of Man and Rats

A. M. Mattson and V. A. Sedlak, Communicable Disease Center, Bureau of State Services, Public Health Service, U. S. Department of Health, Education and Welfare, Savannah, Ga.

When malathion is given to rats, a large proportion is known to be excreted in the urine, mostly as degraded materials. By use of phosphorus-32 labeled malathion it was found that considerable amounts of the radio-active material excreted in rat urine following treatment with malathion could be extracted by diethyl ether. Determination of these extracted metabolites by a colorimetric method for phosphates proved feasible, because urine from control animals contained no detectable amounts of ether-extractable phosphorus-containing materials. Application of this method to human urine after oral administration of malathion also showed the presence of ether-extractable organic phosphates in amounts proportional to dosage. Pretreatment urine had no significant amounts of these materials. Studies were made on the time of appearance, rate of excretion and duration after treatment of these malathion-derived materials in human urine following oral and dermal treatment with malathion. This method is far more sensitive as an index of malathion exposure than is the determination of cholinesterase changes.

Insecticide Residues in Foods Subjected to Fogging Under Simulated Warehouse Conditions

Haig Markarian and Francis Kane, Chemicals and Plastics Div., Quartermaster Research and Engineering Center, Natick, Mass., and Ben Kanatack, Stored-Products Insects Section, Agricultural Marketing Service, USDA, Savannah, Ga.

The present study was initiated to obtain information on the absorption of DDT and lindane by packaged food items which were subjected to repeated aerosol treatments under simulated warehouse storage conditions. This investigation has shown that chemically measurable deposits of DDT and lindane may be found on packaging materials after several aerosol treatments during storage.

In this study both DDT and lindane were found in the food items exposed to the insecticidal fogs. The type of packaging used and the food items themselves were important factors in controlling the amount of the insecticide which migrated into and was absorbed by the food items in the test packages.

In general, where DDT penetrated the packaging, the amount of DDT present in foods increased in proportion to the number of insecticidal applications made in the warehouse. However, lindane residues were not proportional to the number of applications.

Determination of Phosdrin Insecticide Or Methyl Parathion in Formulations

T. T. White and G. G. McKinley, Shell Chemical Corp.

Phosdrin insecticide can be determined in formulated products by either an acid hydrolysis-hydroxylamine hydrochloride or an infrared spectrophotometric method. The latter is preferred because of its greater specificity and good correlation with insecticidal activity. The acid hydrolysis method can be applied to either liquid or solid formulations but will not differentiate between phosdrin insecticide and its decomposition products. For this reason, its major application is in quality control.

Methyl parathion can also be determined in formulated products by either chemical or infrared methods. The infrared method is preferred because of its greater specificity and speed of analysis. The chemical methods, colorimetric or potentiometric, are adaptations of the standard methods of analysis for parathion. They do not differentiate between methyl parathion and its decomposition products or parathion and hence find their greatest use in quality control.

Methyl parathion dust formulations containing aldrin, dieldrin, endrin or DDT can easily be analyzed for both components by infrared methods. ▲

For insecticide formulators

Trained personnel from American Cyanamid Company, developers of malathion and parathion, help you produce and sell phosphate formulations.

In the field — Cyanamid's Field Personnel includes 5 entomologists and more than 60 technical salesmen. All have technical education and a high degree of practical experience. They are on call across the country to consult with you and work with your technical and sales force on all aspects of field use of phosphate insecticides whether new or established uses. These men will be glad to help you arrange local programs with extension people, dealers or growers.

In your plant — Cyanamid makes available to you, *at your plant*, its years of experience in plant hygiene and insecticide formulating. For expert, personal assistance in solving formulation, packaging or hygiene problems, write or call American Cyanamid Company, Agricultural Division, 30 Rockefeller Plaza, New York 20, New York.

Marketing assistance — In addition to on-the-spot sales and technical help, these other Cyanamid activities make your insecticide sales job easier: Major advertising to the farm and garden markets; market investigation and development of new uses; product labeling and analysis; safety programs; and field demonstrations.

CYANAMID

PHOSPHATE INSECTICIDES

STORED GRAIN INSECT C

Major fumigants have been in use for a generation or more.
Two "modern" insecticides have been cleared as protectants.

WITH RECORD AMOUNTS of some grains in storage, and near-record amounts of other grains, what's the effect on the use of pesticides? Two large gaps appear when you look at the overall picture of today's activity in controlling stored grain insects with chemicals.

For this report, authoritative sources were asked, 1) Are there figures available on the quantity of pesticides used for stored grain insect control? and, 2) Are there any reliable estimates of insect infestation?

The answers (and the gaps): 1) The best estimate—and it is a broad one—is that in 1951, 2½ to 4 million gallons of liquid grain fumigants were used. This figure includes mixtures of carbon tetrachloride with carbon disulfide and/or ethylene dichloride. No figures had been reported, on a national basis, on the amounts of other chemical insecticides that had been used on stored grains. 2) There are so many variables, it is impossible to get estimates of the total extent of insect infestation.

However, the 1952 yearbook of agriculture does give an authoritative, although necessarily general, estimate of the damage that can be expected when there are bugs in the bin. "Loss of stored wheat in the Great Plains region may be as high as 10 percent in a season. Corn in storage in the deep South may be destroyed at the rate of 9 percent a month." The annual losses in the United States to cereal grains—and their products—from insect attack have been estimated to be from $200 million to $600 million.

Because insects do get into grain before or after it is stored, the ideal approach would be to apply a protectant—and by mixing it with the grain, protect against insects during the total storage period. A satisfactory protectant would have to be 1) of low mammalian toxicity 2) able to keep out all stored grain insects 3) effective over a period of five years or more—without leaving harmful residues or hurting germination of the grain 4) harmless to the quality of the grain. Protectant sprays and dusts may be applied in the combine hopper at harvest time, or during transportation or start of storage.

Tolerances have been established by Food and Drug Administration for malathion and pyrethrins– piperonyl butoxide mixtures as protectants for stored grain. The Marketing Research Division of the Agricultural Marketing Service, U. S. Department of Agriculture, is conducting tests with several other insecticides. These are exploratory studies—to help in considering the establishment of tolerances on certain grains. Some materials on which progress reports have been issued are methoxychlor, lindane and ryania.

MORE ART THAN SCIENCE

You fumigate to kill insects already in the grain. As Donald A. Wilbur, Kansas State College entomologist, has pointed out: "There is no continuing effect from fumigants once the gas is dispelled . . . fumigants are effective only when the structure that holds the grain is sufficiently tight that a concentration of gas can be maintained long enough to be lethal."

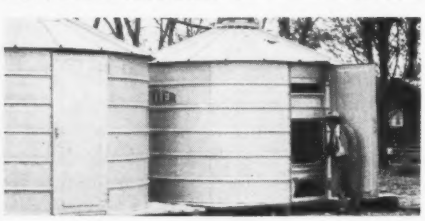
Wilbur has also said, "In spite of the technical developments in materials and methods, grain fumigation remains more of an art than a science. This is due to the many variable factors that influence fumigations. Grain handlers are appreciably more successful with fumigants than are farmers, largely because

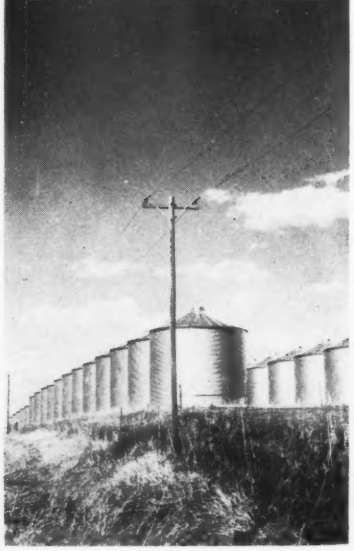
USDA Photos

GRAIN IN STORAGE

Major Grains	Billion Bushels
Corn	3.9
Wheat	1.8
Oats	1.1
Grain Sorghum	.7
Soybeans	.5
Barley	.4
Flax Seed	.03
Rye	.02

These amounts, reported January 1, 1959, include farm, Commodity Credit Corporation terminals, mills, processing plants, ships and elevators—all potential homes for grain-destroying insects. Left, a liberty ship takes on wheat before being anchored in the Hudson River as a floating grain bin. Right, USDA 3250 bushel bins in the wheat belt.





CT CONTROL

special report

commerical grain handlers have greater 'know how' and because of the more uniform and stable conditions in their grain storage plants.

"Even the objectives of grain fumigation will vary. Grain handlers who want to store grain for long periods want a 100 percent kill. Some ask only for a 'commercial' kill. Others want the fumigant to still those insects on the outside of the kernels so that the sample will not be termed 'weevily' by the official grain graders."

THE IDEAL GRAIN FUMIGANT

What do you look for in a grain fumigant? Richard T. Cotton, retired technical adviser for USDA's stored products insects section, says, "The *ideal* fumigant is one that is 1) rapidly effective against insects in concentrations which are not harmful to warm-blooded animals, 2) inexpensive, 3) readily available, 4) easily handled, 5) harmless to the product being treated, 6) not absorbed excessively, 7) effective at all temperatures. Such a fumigant is unknown at the present time . . ."

A *good* grain fumigant, according to H. H. Walkden of the same USDA section, must have these eight characteristics: 1) Low cost per unit of grain. The choice of fumigant quite frequently depends upon its cost per 1,000 bushels of grain, 2) When applied to the grain, liquid fumigants should vaporize rapidly, producing a heavier-than-air gas which diffuses readily through the entire grain mass. 3) It should be non-flammable, and non-explosive—some of the most toxic compounds are highly flammable or explosive in air mixtures, hence cannot be used safely in grain fumigations. 4) It should not impart any objectionable odor to the grain. Some compounds

Feed mill covered with tarpaulins and ready for fumigation.

USDA Photo

are toxic enough but impart persistent odors to the grain which may be carried over into bread baked from flour milled from fumigated what. 5) It should not affect the commercial grade adversely. Some fumigants impart persistent odors. 6) It should not affect the baking qualities of flour milled from fumigated wheat. Some fumigants hurt the dough's raising quality. 7) It should not affect the viability of the seed. Some compounds, excellent fumigants, hurt the germination rate. 8) It should leave no harmful residue in the grain.

"Three types of formulations are commonly used in practical fumigations," says W. Keith Whitney, Kansas State College entomologist. He recently reported that, "The liquid formulations such as 80:20 (carbon tetrachloride:carbon disulfide) and 75:25 (ethylene dichloride: carbon tetrachloride), are probably the most commonly used in farm and elevator storage. Solid formulations, such as calcium cyanide, are well adapted for application to grain as it is moved from one bin to another. Toxic gas is evolved from the solid fumigants as they react with the water vapor in the air. Materials that are gases at ordinary temperatures and pressures, such as methyl bromide and hydrogen cyanide, are quite efficient and are well adapted for application with the forced distribution method. The gases are efficient low-temperature fumigants.

TEN MAJOR FUMIGANTS

"Of the 25 or 30 chemicals used, ten constitute about 95 per cent of all in common use. Special chemicals are used to serve as toxicants, fire and explosion suppressors, diluents or carriers, warning agents, synergists, grain conditioners, penetrants and propellants. The method of application is determined primarily by the type of formulation."

And what about applying the fumigants? It's now conceded that the greatest developments in fumigating in recent years have been in techniques of application—to improve efficiency, economy and safety. There are today five methods of applying fumigants:

▶ Mixing with the grain. The liquid-and solid-type fumigants can be distributed throughout bulk grain by

adding them to the grain stream as the bin is being filled. The fumigant is applied either by hand or automatically. If applied to each 1000 or 1500 bushel draft this is known as the layering method.

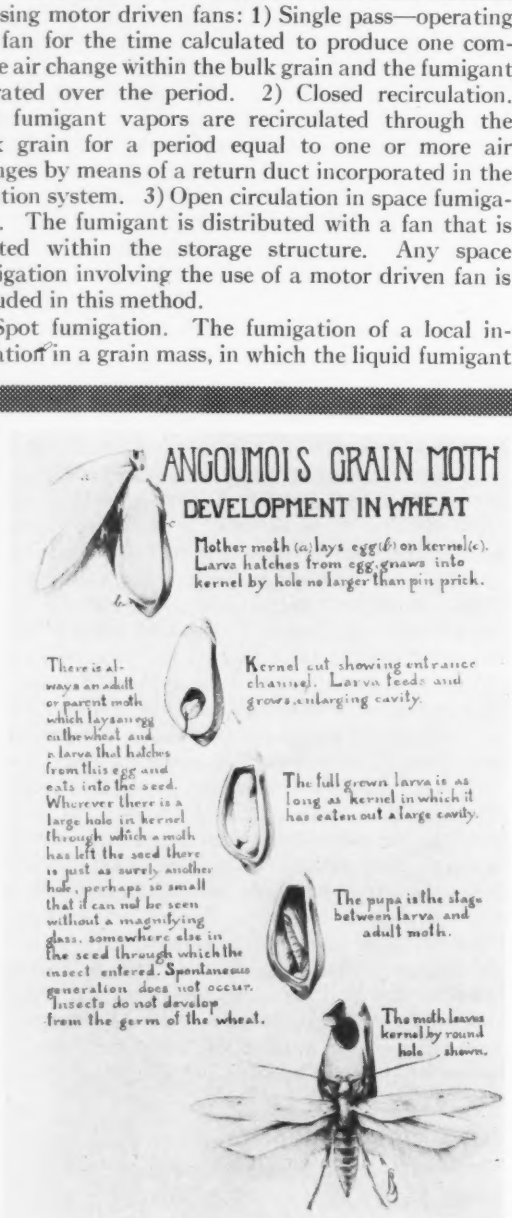
▶ Gravity penetration. The liquid-type fumigant is applied to the surface of the grain, and the heavier-than-air vapors gravitate downward and eventually permeate all parts of the bulk grain.

▶ Forced distribution. There are three basic methods of using motor driven fans: 1) Single pass—operating the fan for the time calculated to produce one complete air change within the bulk grain and the fumigant prorated over the period. 2) Closed recirculation. The fumigant vapors are recirculated through the bulk grain for a period equal to one or more air changes by means of a return duct incorporated in the aeration system. 3) Open circulation in space fumigation. The fumigant is distributed with a fan that is located within the storage structure. Any space fumigation involving the use of a motor driven fan is included in this method.

▶ Spot fumigation. The fumigation of a local infestation in a grain mass, in which the liquid fumigant is applied to the grain surface above the area of infestation.

▶ Space fumigation. This method consists of the fumigation of empty or loaded warehouses and fumigation vaults, as well as freight cars, van trucks and similar enclosures. Fumigation under gas-tight tarpaulins is also included in this category. The term "space fumigation" is thought to originate with the practice of basing dosage rates on volume of enclosure.

The overall problem of fighting insects in stored grain is a complex one. Herbert Knutson, head of the entomology department at Kansas State College in Manhattan (which is also the location of the USDA Stored Grain Insects Laboratory) has pointed out that variables in the research on this problem "include the differences in behavior and habits of the various species of insects, their relative ability to withstand high and low temperatures, moisture content of grain, the relative susceptibility of the various life history stages of the same insect species, the rates at which the fumigants are absorbed by the various grains and the relation to moisture content and temperature."


ANGOUMOIS GRAIN MOTH
DEVELOPMENT IN WHEAT
Mother moth (a) lays egg (b) on kernel (c). Larva hatches from egg, gnaws into kernel by hole no larger than pin prick.
There is always an adult or parent moth which lays an egg on the wheat and a larva that hatches from this egg and eats into the seed. Wherever there is a large hole in kernel through which a moth has left the seed there is just as surely another hole, perhaps so small that it can not be seen without a magnifying glass, somewhere else in the seed through which the insect entered. Spontaneous generation does not occur. Insects do not develop from the germ of the wheat.
Kernel cut showing entrance channel. Larva feeds and grows, enlarging cavity.
The full grown larva is as long as kernel in which it has eaten out a large cavity.
The pupa is the stage between larva and adult moth.
The moth leaves kernel by round hole shown.

Most damage done by insects to grain in storage and shipments is done by four species: the granary weevil, rice or black weevil, lesser grain borer and the Angoumois grain moth. The only larva of these four that can exist outside the kernel is that of the lesser grain borer. The drawing and explanation, widely circulated by USDA, serves to dispel the belief in spontaneous generation of an insect from the wheat germ.

HOW INSECTS ARE FOUND

There are five groups of methods that have been used for finding hidden insect infestations in grain, and determining their extent. These are: 1) visual method without a previous kernel treatment; 2) visual method following a kernel treatment; 3) chemical methods; 4) physical methods; 5) aural methods.

According to Phillip K. Harein, Kansas State College entomologist, the first group includes counting the number of emergence holes in a grain sample.

The second group includes staining techniques, alkali treatments and fluorescent methods.

The third group, chemical methods, includes the measurement of carbon dioxide, spectrophotometric analysis of hydroxyphenol (a component of insect cuticle) and the cracking-flotation procedure.

The fourth group includes separating the infested kernels from the sound kernels by projection, air blast, X-ray and flotation.

The aural method is amplifying the sounds that insects make inside the kernel.

Most important methods to the country elevator operator are staining, flotation and X-ray. X-ray is considered to be the fastest and most accurate method.

HOW FUMIGANTS KILL

Fumigants kill insects by preventing the assimilation of oxygen by the tissues. The simple asphyxiants such as carbon dioxide, nitrogen and hydrogen, while not poisonous to insects, replace the oxygen of the atmosphere and thus mechanically keep oxygen away.

The more effective fumigants—and those most used—upset the activities of enzymes associated with cell respiration, preventing the insect's body tissues from uniting with oxygen in the normal manner.

NEWS OF THE INDUSTRY

C&I TO BUILD TWO CALSPRAY KENNEWICK, WASH. UNITS

P. S. Williams, vice president and chief engineer of California Spray-Chemical Corp., has announced that Chemical and Industrial Corp. of Cincinnati, Ohio, will build both the nitric acid plant and the ammonium nitrate plant, part of Calspray's multi-million dollar fertilizer plant at Kennewick, Wash.

The Kennewick plant will manufacture ammonium nitrate, ammonium nitrate solutions and high analysis nitric phosphate complex plant foods. Expected to be in operation by the end of 1959, it will supply the company's Pacific Northwest and Rocky Mountain distributors.

MOLTEN SULFUR TERMINAL AT TAMPA IS PLANNED

Plans to establish a molten sulfur terminal at Tampa, Fla., employing for the first time an ocean-going vessel specially designed to ship sulfur in liquid form, were announced in New Orleans, March 17, by Texas Gulf Sulphur Co. and DeBardeleben Marine Corp. of New Orleans.

According to spokesmen for the two companies, beginning in August molten sulfur will be shipped to the new DeBardeleben terminal at Tampa from Texas Gulf's loading terminal at Beaumont, Tex., in a Liberty vessel purchased recently which will be converted by DeBardeleben. The transport will be equipped with steam-heated tanks capable of holding 7,500 tons of molten sulfur, making it the largest carrier ever used for liquid sulfur shipments.

At Tampa, the molten sulfur will be stored in steam-heated tanks and held for distribution by railway tank cars or tank trucks to industrial users in the surrounding area. Texas Gulf currently has storage facilities at Tampa for dry solid sulfur.

"The decision to shift part of our Florida sulfur shipments to molten form," said Claude O. Stephens, president of Texas Gulf, "was taken to enable us to provide better service to the many consumers of this basic commodity in this area. The trend today in our industry is toward greater use of olten sulfur."

Henry F. DeBardeleben, chairman of the board of DeBardeleben Marine Corp., said that the new transport can "carry 2,500 tons of solid sulfur or other dry bulk commodities, in addition to the 7,500 tons of liquid sulfur. Alternatively, she can carry 8,000 tons of dry cargo, which is our plan for our westernly return trips."

Among the bulk commodities they plan to transport, he said, are ammonium sulfate, potash, salt cake, phosphate rock, triple superphosphate and ore.

N DIV. SENDS WEATHER FORECASTS TO CUSTOMERS

Nitrogen Div., Allied Chemical Corp., has begun distribution of monthly weather forecasts to its fertilizer dealers and manufacturer customers all over the country. The forecast for each month will be mailed about a week before the month begins.

"Weather is one of the most important factors in the fertilizer business," a Nitrogen Div. spokesman pointed out," and we expect the new service to be invaluable to our customers in making sales and manufacturing plans."

Said to be 80 per cent accurate, the forecasts are prepared for Nitrogen Div. by Weather Trends, Inc. In addition to a summary giving over-all weather predictions, each forecast will include colored charts and maps showing expected precipitation and temperatures in each section of the country.

ANOTHER ARCADIAN SERVICE TO FERTILIZER DEALERS

Arcadian

WEATHERVANE

A WEATHER FORECAST FOR MAJOR CLIMATOLOGICAL REGIONS

MARCH 1959

March's Weather Outlook At a Glance

- March will be colder than normal in the Far West and throughout most of Canada. In contrast, the Central States, from South Dakota to southern Texas, will average approximately four degrees warmer than usual and as much as twelve to sixteen degrees warmer than last March. Elsewhere in the country, monthly averages will be slightly milder than normal.
- Precipitation is expected to be relatively heavy in eastern Canada and northern New England; the Central States, from Wisconsin to Louisiana; and, parts of the Far West, including Washington, British Columbia, central California and Nevada. Scattered dry areas are forecast for southern Florida, southwest Texas, the Mid-Atlantic States, Nebraska, the Dakotas, Oregon and the Prairie Provinces of Canada.
- Last year, a severe wind and snowstorm occured in the Northeast from March 19th through the 22nd. At least 49 deaths were attributed to this storm and damage to utility companies, alone, amounted to well over $20 million. Pages 2 and 3 give a more detailed description of expected conditions, by region.

YOUR Arcadian REPRESENTATIVE

THE TEXAS CO. CHANGES NAME TO TEXACO INC.

The board of directors of The Texas Co. has voted to change the name of the company to Texaco Inc. subject to ratification by the stockholders at the annual meeting April 22.

"The wide distribution and sale of its products bearing the trademark 'Texaco' in all 49 states and in many foreign countries have resulted in the company being generally known and referred to as 'Texaco' by its stockholders, customers, employees and the general public," said Augustus C. Long, chairman, in making the accouncement.

AGRICO BUYS SITE IN MINNESOTA

American Agricultural Chemical Co. has purchased a 64-acre site at Sleepy Eye, Minn.

B. R. Richey, vice president of the company, indicated that a fertilizer plant would be constructed on the site "at a future date."

ANTARA NAMES DISTRIBUTOR

Antara Chemicals, sales division of General Aniline & Film Corp., has appointed Amsco Solvents & Chemicals Co., 4619 Reading Rd., Cincinnati, Ohio, as distributors for Igepal CO and CA surfactants. They will serve Cincinnati, Dayton, Columbus, Springfield and the southern Ohio area.

HAZLETON LABS NAMES FIELD SAMPLING AGENT

GRS (Growers Residue Service), a department of Hazleton Laboratories, Inc., which provides pesticide residue analyses for Western growers, has named Valley Laboratories of Phoenix its field sampling agent—to serve applicators and growers in Arizona.

GRS was organized less than a year ago in response to growers' requests for such a service, according to Hazleton Laboratories. The laboratory has cooperated with pesticide manufacturers in development of their products, and thus can make its analytical facilities available to pesticide applicators and growers on a fixed-fee basis.

1958 POTASH DELIVERIES UP 10% FROM 1957

Deliveries of agricultural potash in the United States, Canada, Cuba, Puerto Rico and Hawaii by eight American producers and the importers totaled 3,805,057 tons of salts containing an equivalent of 2,229,724 tons K_2O during 1958, according to the American Potash Institute. This was an increase of 10 per cent in salts and K_2O over the same period in 1957.

Continental United States took 2,090,659 tons K_2O; Canada, 89,396 tons; Cuba, 16,482 tons; Puerto Rico, 16,528 tons; and Hawaii, 16,659 tons K_2O. These figures include imports from Europe of 237,269 tons K_2O. Exports to other countries totaled 228,156 tons K_2O, an increase of 11 per cent.

Deliveries of potash for non-agricultural purposes amounted to 118,707 tons K_2O, a decrease of 8 per cent from last year. Total deliveries for all purposes reached 4,379,455 tons of salts containing an equivalent of 2,576,587 tons K_2O, an increase of 9 per cent in salts and K_2O.

In the United States, agricultural potash was delivered in 46 states and the District of Columbia. Illinois with over 200,000 tons K_2O was the leading state followed in order by Indiana, Ohio and Georgia, each taking more than 150,000 tons K_2O during the year. Because of shipments across state lines, consumption does not necessarily correspond to deliveries within a state.

Agricultural potash made up nearly 95 per cent of deliveries. Muriate of potash continued to be by far the most popular material, comprising over 93 per cent of the total K_2O delivered for agriculture, and sulfate of potash and sulfate of potash magnesia 7 per cent.

NEW COMPANIES

Howard L. Marshall, Inc., a new lime and fertilizer dealership in Louisa, Va., has been granted a charter of incorporation. The firm will conduct a spreading operation in Louisa County and parts of Hanover, Fluvanna, Spotsylvania and Orange Counties. Howard L. Marshall is owner and registered agent.

Pelican State Lime Corp., 819 Brashear Ave., Morgan City, La., has been granted a charter listing capital stock of $400,000.

$8.5 MILLION FERTILIZER PLANT FOR YUGOSLAVIA

A contract was signed in Belgrade on Feb. 28 between the Italian companies, Montecatini and Ansaldo, and the Yugoslav "Rudnap" Company for construction of an $8.5 million nitrogen plant at Lukavaz in Bosnia. Construction is slated to begin immediately.

The plant will produce 100 metric tons a day of anhydrous ammonia using coke oven gases supplied by an already existing coke oven plant. In addition, 340 metric tons per day of nitric acid and 380 metric tons per day of nitrochalk containing 20.5 nitrogen will be produced.

Equipment and machinery for the new plants will be supplied by Societa Ansaldo of Genoa.

LIQUID, DRY NITROGEN ARE OK FOR CORN

Michigan corn plants aren't very choosy when it comes to the form of nitrogen they'll use. Their biggest concern is that they have all they'll need for growth.

Research at the Michigan Agricultural Experiment Station shows that nitrogen solutions produce yield increases equal to any other form of nitrogen.

L. S. Robertson, soil scientist at the station, has urged farmers to evaluate the forms of nitrogen fertilizer materials on the bases of ease and cost of application.

POTASH SOLUBILITY HAS NO EFFECT ON YIELDS

The degree of water solubility of potassium fertilizer apparently has no effect on crop yields, according to recent University of Minnesota studies.

Corn fertilized with potassium metaphosphate and potassium pyrophosphate—two low solubility fertilizers—yielded as well as fields getting potash in conventional high-solubility form.

Common form of potash in Minnesota fertilizers is muriate of potash, which is 100 per cent soluble in water. In potassium metaphosphate, 45 per cent of the potassium is water soluble, and a fourth of the potassium in the pyrophosphate form is soluble.

J. R. Kline and A. C. Caldwell, soils scientists, made these studies. They were checking on two things: whether solubility differences would affect yields and whether lower solubility fertilizer would make potassium more uniformly available to crops over a longer period of time. They report that the answer seemed to be "no" on both counts.

Potassium pyrophosphate of large particle size brought lower corn yields. But when this fertilizer was finely ground, the scientists said that corn yielded as well as it did from muriate of potash.

NEW AGRICO WATER SOLUBLE IS AVAILABLE THIS SPRING

The American Agricultural Chemical Co. reports it will make Agrico Water Soluble available to home gardeners, golf courses and nurserymen this spring. The 17-17-17 granular fertilizer is completely soluble, even in cold water, and contains minor elements. It will be packaged in 8-ounce jars and 3-pound foil packages for home use, and in 50-pound drums for commercial and industrial use.

ONYX NAMES WASATCH A DISTRIBUTOR

Wasatch Chemical Co., Salt Lake City, Utah, has been appointed by Onyx Oil & Chemical Co. to distribute its chemical products in Idaho, Montana, Utah and Colorado. The Onyx line includes amides, quaternaries, and fatty alcohol sulfates.

MAINTAINING GRADE WITH HIGH ANALYSIS MATERIALS

C. B. Hendrix, field representative for the Tennessee Valley Authority, reports that when several manufacturers experienced difficulty in maintaining grade with high-analysis dry mixed materials, TVA representatives interviewed seven firms who produce high analysis fertilizers. Among the observations they made after inspecting plant, operating procedures and equipment were:

1) Major ingredients of any particular dry mix should be of the same approximate particle size to minimize segregation. Powdery mixes should not be stored for long periods of time.

2) A maximum mixing time of 30 to 40 seconds should be used in dry mixing, particularly where a change in particle size might take place.

3) Dry mixes have no shrinkage as do mixtures produced using solution; therefore more care must be exercised in maintaining grade. Dry mixes may absorb small amounts of moisture, thus reducing grade.

4) An overage should be used in all high-analysis mixtures; 0.2 unit for each constituent is close to a minimum figure where sizes of the major ingredients are compatible and good mixing is obtained. In some grades a larger overage may be required.

5) Diammonium phosphate and superphosphate should not be premixed for long periods of time prior to use in batch or continuous processes with nitrogen solutions. No harm is done in dry mixes except perhaps some affect on physical condition of the mix. If a mixture containing diammonium phosphate and superphosphate is blended prior to ammoniation, however, the amount of ammonia that the superphosphate will take up will be reduced by the amount of ammonia the superphosphate may have absorbed from the diammonium phosphate.

AMCHEM NAMES PR AGENCY

Amchem Products, Inc. (formerly American Chemical Paint Co.) has appointed the agency of Margaret Herbst, New York City, to handle public relations on corporate as well as product levels.

Associations Meetings

INTENSIFIED SOIL TEST PROGRAM IN MICH. COUNTY WILL BE LAUNCHED MAY 28

Timetable for launching the intensified soil testing program in Ionia County, Mich., was announced last week.

This program, sponsored by the National Plant Food Institute and the Mighigan Agricultural Extension Service, is designed to encourage more efficient crop production by farmers, through the use of lime and fertilizer. Supervising and correlating the program will be Fred Peabody, county extension director of Ionia County and John R. Guttay, Institute district representative, with headquarters at East Lansing, Mich.

A kickoff dinner is scheduled for May 28, at Ionia, county seat, to get the program officially underway. Farmers, county businessmen, editors and agricultural workers will be there.

At this dinner, the new Michigan Crop Production Potential wall charts and checklists will be presented for the first time. In addition, posters, publicity kits and other information materials will be distributed.

On June 2 there will be a Fertilizer Industry Meeting, at which dealers and salesmen serving Ionia County farmers will be told of the program's importance to them and how they can cooperate in it.

During early June the progam will be presented to interested groups, including service clubs, bankers, home demonstration personnel, 4-H Clubs, FFA chapters, vo-ag classes and soil conservation specialists.

Special meetings will be held throughout the county during June to provide instruction in collecting soil samples, soil testing and analysis. Arrangements will be made for establishing depots for collecting soil samples.

Aim is to reach 100 per cent of Ionia County's farmers in 1959 and the years immediately following to boost gross agricultural income by $4,000,000 and net income by $2,000,000.

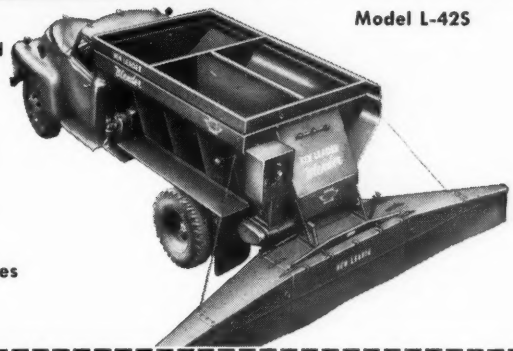
The project is part of the program recommended by NPFI's Midwest Research and Education

Accurately Blends and Spreads 3 Fertilizers at Once!

NEW LEADER MOBILE BLENDER

Model L-42S

- Lets you offer mixed analysis at lower, bulk rates!
- 3 Separate compartments!
- 36" Conveyor synchronized to speed of truck by drive shaft drive!
- 7.0 H.P. Engine drives Twin Spinners!



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694 D Ave. N. W. Cedar Rapids, Iowa

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ADDRESS.....

TOWN.....STATE.....

Mail coupon for L-42S literature and a copy of "Your Land Is Different" a booklet designed to help you sell more bulk fertilizer.

Committee, headed by R. P. Thomas, International Minerals and Chemical Corp. A Soil Testing task force, under the chairmanship of Leo Orth, Sinclair Petrochemicals, has advised on plans for the program.

ALA. SOIL FERTILITY CAMPAIGN IS 'ROLLING'

The Alabama Soil Fertility Campaign is rolling in high gear, according to J. C. Lowery, extension agronomist with the Alabama Agricultural Extension Service and Frank Boyd, president, Alabama Soil Fertility Society. Kick-off meetings had been held in 20 counties across Alabama at the time of their report.

Under the direction of county agents, the meetings brought together bankers, farmers, agricultural workers, fertilizer people, radio, newspaper and TV representatives, as well as many businessmen in the communities. Frank Boyd addressed most of the meetings, stressing the importance of soil testing as a guide to better fertilizer and liming practices. Boyd said, "The biggest smokestack in Alabama is agriculture. Let us all stoke the furnace together to increase our agricultural income by millions of dollars." Alabama's agricultural income can be increased to $750,000,000 if agricultural practices are adopted, he said, and "these practices should begin with a soil test and the adequate use of lime and fertilizer based on the results of these tests."

DISCUSSING MERCHANDISING METHODS

Fertilizer dealers, distributors and their representatives from northern Utah met recently at a dinner session in Brigham City to discuss more effective merchandising methods and techniques.

Sponsor of the meeting was U. S. Steel Corp.'s Coal Chemical Sales Div., with Frank E. Adams, western manager in charge of the affair.

Shown below discussing USS nitrogen fertilizers are (from left) Dr. H. C. Millar, Geneva Food and Chemical Co.; W. T. Cato, Agri Chemical Corp.; L. G. Walton and Rodney Porter, Porter Walton Seed Co.; Rex Berry, coal chemicals sales representative, USS; Dr. R. C. Lipps, USS agronomist; LaVar Thatcher, Wasatch Chemical, and Jack Loveless and John P. Hopkinson, Utah Poultry and Farmers Cooperative. All the dealers attending market USS nitrogen fertilizers.

Millar, Cato, Walton, Porter, Berry, Lipps, Thatcher, Loveless and Hopkinson

RICE RESIGNS AS CFA COMMITTEE AGRONOMIST

Malcolm F. Rice resigned his position as agronomist with the Soil Improvement Committee of the California Fertilizer Association March 1.

He had been associated with the committee since November 15, 1957. He is entering "active farm management" in the Imperial Valley of California.

AGRONOMY ACHIEVEMENT AWARD TO D. L. WAUGH

Donovan L. Waugh (center) a senior student in agronomy and soils, University of Wisconsin, is 1958–59 winner of the National Plant Food Institute's Agronomy Achievement Award at the university. He is shown with Dr. L. E. Engelbert (left) chairman,

soils department, and Dr. V. E. Kivlin, associate dean of agriculture.

The NPFI award included a plaque with Waugh's name which will be retained at the University, $200 and an engraved key. The award is based on scholarship, leadership and need.

GEORGIA DEMONSTRATIONS SHOW FERTILIZERS' VALUE

"The adequate use of lime and fertilizer combined with other good management practices has increased yields, lowered unit costs of production and increased net income from the production of cotton, corn and Coastal Bermudagrass, "says W. H. Sell, extension agronomist with the Georgia Agricultural Extension Service.

His statement was based on results of a number of demonstrations conducted during the past year throughout the state. Cotton yields range from 432 to 1,235 pounds of lint per acre, with an average for all demonstrations of 952 pounds per acre. Eight out

of the 13 demonstration plots produced over one and one-half bales of lint per acre. Demonstrations were carried out on plots which varied from 5 to 25 acres.

TOP SUGAR BEET, CORN GROWERS HONORED

Two of Colorado's top sugar beet and corn producers were honored at the National Farm and Ranch Congress meeting in Denver. Secretary of Interior Fred A. Seaton (second from left) presents certificates to the farmers who were singled out as new members of the 200 Bushel Corn Club and 10,000 Pound Sugar Club.

Left to right are Dr. Richard Bahme, western regional director of the National Plant Food Institute, co-sponsors of the award; Secretary Seaton; Byers Clark of Greeley, sugar beet grower; Dale Richardson of Wiggins, 200 Bushel Corn Club; and Rodney Tucker, extension agronomist, Colorado State University, co-sponsors of the award.

Bahme, Secretary Seaton, Clark, Richardson and Tucker.

Also enrolled as new members of the 10,000-pound Sugar Club were Harold Stark, Edward Heimbuck and Edwin C. Cook. Seven corn growers were honored at the meeting for producing more than 200 bushels of corn per acre.

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Progress in Fire Ant Control Reported At Ala. Conference

THE SHROUD OF MYSTERY surrounding the imported fire ant may be lifted in the near future. Scientists from Texas to Washington, D. C., are delving into the life secrets of the pest in attempts to gain further detailed information, according to Dr. F. S. Arant, zoology-entomology department head, API Agricultural Experiment Station, who is chairman of the regional project.

Speaking at the Feb. 24 session of the 12th Alabama Pest Control Conference held at Auburn, Dr. Arant said the research is being done cooperatively by the State Departments of Conservation and Agriculture and Industries, U. S. Department of Agriculture, and state experiment stations of Alabama, Arkansas, Florida, Louisiana, Mississippi, Texas, Georgia, and South Carolina.

The researcher said that a new project is to be started soon that will involve treatment of two 20,000-acre areas with an insecticide used for fire ant and control and eradication. At press time, it was not known what insecticide would be used. A meeting was planned between all cooperators to work out final details.

An untreated area of about the same size will serve as a check area.

He explained that before treatment an intensive study will be made to determine the population of mammals, birds, reptiles, amphibians and fishes, insects, and other organisms. The studies will be continued for two to three years after the treatment to measure immediate and long-range effects of the control measures. This new project is designed to answer questions being asked about large-scale control and eradication programs, Dr. Arant explained.

The joint USDA and Alabama State Department of Agriculture program for control and eradication of fire ants has been well received by both rural and urban people, according to a statement made by W. O. Owen, supervisor in charge of the Southern Plant Pest Control Office, Montgomery. He said block treatments are now in progress in 26 counties in the state and requests for treatment of additional areas and additions to already treated areas continue to be submitted. At the end of January, Owen said, 285,667 acres had been treated with approved insecticides and farmers had signed agreements for treating over a half million acres this year.

SCREWWORM ERADICATION

Good progress in the cooperative campaign to eradicate the costly screwworm was reported by Dr. R. S. Sharman, chief staff officer of the USDA eradication work. In this program, male screwworm flies made sterile by exposure to

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radio-active cobalt are used to saturate the natural population of the pest. Since female flies mate only once, all those that mate with sterile males fail to reproduce, thereby reducing the population. Dr. Sharman called this "a brand new concept in large-scale eradication of insects," and said it is the only program of its kind in the world.

During 1958 sterile flies were dispersed over an area of nearly 85,000 square miles, the veterinarian said. He said the cold winter of 1957–58 drove the overwintering area of the screwworm well into Florida and gave a distinct advantage to the campaign. Dispersal of sterile flies was made over a 100-mile-wide strip across Florida at about the overwintering line and a little beyond to stop the seasonal migration northward. This appears to have been accomplished, he said, since only two cases were reported in Georgia—in the extreme southern area—in 1958. "Usually numbered in the thousands during a season, screwworm cases were in the hundreds, representing savings of many millions of dollars in 1958," he declared.

A panel on "What's New" featured a report on new insecticides by Dr. B. W. Arthur, assistant entomologist of the API Agricultural Experiment Station. He reported that several organophosphate, chlorinated hydrocarbon,

New pesticides were discussed by this forum during the Alabama Pest Control Conference. Left to right are R. F. Richards, Geigy Agricultural Chemicals; Dr. U. L. Diener, associate plant pathologist of the API Agricultural Experiment Station who moderated the forum; James A. Lanier, Chemagro Corp. and Norman Downey, Hercules Powder Co.

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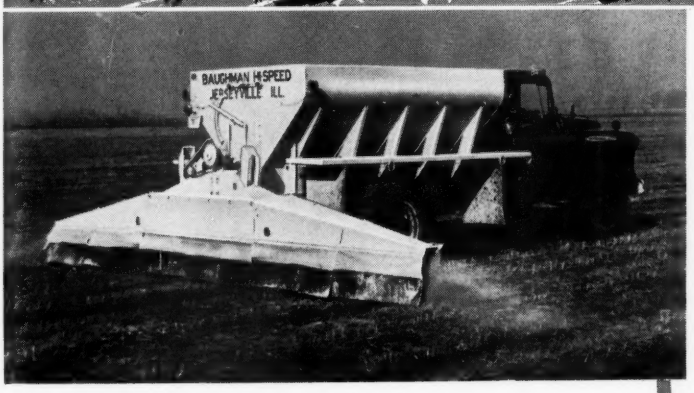

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and carbamate insecticides are being evaluated at Auburn for control of plant and animal insect pests. Some of the materials were recommended in 1958, he said, others will be recommended this year, and some are still in the experimental stage.

He said the organophosphates Delnav, Phosphamidon, Trithion, and Ethion appear promising for control of aphids and spider mites on plants. Trithion has shown promise for controlling boll weevils and Delnav is undergoing extensive tests for the control of external pests of livestock, he reported. Dibrom, a short residual contact insecticide of low toxicity to mammals is effective for controlling vegetable insects and house flies, the researcher stated. He said four new Bayer phosphates, 22408, 25141, 25198, and 29493, were tested during 1958 for control of several plant feeding insects, and Bayer 29493 also showed promise as an animal systemic. Thiodan and Tedion are new insecticides that are being evaluated in Alabama for controlling a wide range of plant insects and mites. Dr. Arthur said Trolene and Co-Ral are now recommended for cattle grub control, and pointed out that the Co-Ral is also effective against screwworms, ticks, and lice. He named Dimethoate, Shell SD3562, Bayer 29493, and Dowco 109 as promising animal systemics.

NEW PRODUCTS FORUM

The two-day program ended with an industry forum describing new products. J. A. Lanier, Chemagro Corp., Thibodaux, La., said that trial sales of Co-Ral were begun last summer, but that little volume of the product had been used. He said although there were reports of the product causing cattle abortions and bull sterility, their investigations indicated that this will not be a problem.

Atrazine, a compound that is related to Simazine, was discussed by R. F. Richards of Geigy Agricultural Chemicals, Orlando, Fla. He explained that Atrazine is effective as a post-emergence as well as pre-emergence chemical and can be used later in the season than Simazine. In addition, the new product penetrates deeper than Simazine and is more effective against hard-to-kill perennials like bermudagrass. This product is now commercially available, Richards said.

The Alabama Association for Control of Economic Pests, which sponsored the conference in cooperation with the API School of Agriculture and Agricultural Experiment Station, met in conjunction with the conference. New officers elected were Dr. W. G. Eden, Experiment Station entomologist, president; W. T. BeBusk, Pennsalt Chemicals, Montgomery, vice-president; Dr. J. W. Rawson, Experiment Station assistant entomologist, secretary-treasurer; Walter Grimes, Extension Service survey entomologist, editor; and Joe Sanders, Cullman Feed and Seed Co., and W. O. Owen, USDA Plant Pest Control Office, Montgomery, directors.

People

American Agricultural Chemical Co. Continuing the reorganization brought about by recent expansion and acquisition, the firm announces the following personnel changes:

LeCureux

D. L. LeCureux, former assistant manager, becomes branch manager at Saginaw, Mich.; W. H. Phillips, who had been assistant manager, becomes manager at East St. Louis, Ill.; D. J. Boyer, former manager at Three Rivers, N. Y., has been named

Phillips

Boyer

branch manager at Buffalo, N. Y. He is succeeded at Three Rivers by Edgar B. Stalnaker.

Named assistant branch managers: T. S. Bryars, Montgomery, Ala.; J. W. Grooms, Nashville, Tenn.; and J. H. Dorsey, Cairo, O.

Dr. Donald P. Satchell has joined the AAC Service Division New York City staff. He had been on the agronomy staff at The Pennsylvania State University.

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by Myron E. Lusk, President and Research Director, Kalo Inoculant Company

There is *one* product line left in farm chemicals and seeds where the profits are still *lucrative*. That line is private label legume inoculation.

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Kalo can install a legume inoculant line for you if you do not have one. Or show you ways to bring your present line up-to-date.

Consult At No Cost

We make consultation and analysis trips to your office, study your territory, outlets, and market. Then at no charge, we prepare a consultation analysis showing you step-by-step what we can do for you.

To arrange a meeting, merely clip this advertisement to your letterhead or call me personally. Mr. Myron E. Lusk, Kalo Inoculant Company, 525 Kentucky Street, Quincy, Illinois. BAldwin 2-7383.

Battelle Memorial Institute. William L. Swager has been named assistant manager of the Dept. of Economics. When he joined the research center's staff in 1948, Swager devoted much of his effort, initially, to economic studies of the chemical industry. In more recent years his studies have covered a wide range of industries, including metals, forest and lumber, paper and aircraft and missile producers.

Swager

Calcium Carbonate Co. has appointed Sherman Bond technical director, effective March 1. Most recently, Bond was manager of the Farm Laboratory Div. of Albert Dickinson Co. Before that, he served as laboratory director of Kalo Inoculant Co.

Bond

Chemagro Corp. Election of George W. Hill, Jr. as chairman of the board and Herbert F. Tomasek as president has been announced. Succeeding Hill as president, Tomasek will locate at Chemagro's recently completed Kansas City plant, where administrative, sales, research and manufacturing facilities are now concentrated.

Tomasek

Vice presidents elected were Hugh H. Swink (sales), Dr. Rosmarie von Rumker (research and development), and Dr. Robert C. Scott (manufacturing). All had served for several years as heads of their respective departments.

Eastern States Farmers' Exchange. Cleon Phelps has been promoted to manager of plant operations for agricultural chemicals and farm supply departments at both the West Concord, Mass., and Spring Garden, Pa., plants.

Perry H. Wetzel, assistant in agricultural chemicals purchasing department, has been promoted to manager of the department.

Geigy Agricultural Chemicals, Div. of Geigy Chemical Corp. Howard S. Beaudoin has been named to the firm's field research staff and assigned to the Pacific Northwest area. Previously, Beaudoin was Deputy State Entomologist, Wyoming State Dept. of Agriculture. He goes to Geigy from Velsicol Chemical Corp.

Beaudoin

Little

Appointment of E. Robert Little as sales representative, to cover central and northern California, also was announced.

Naugatuck Chemical Div., U. S. Rubber Co. Edward J. Geise replaces Albert W. Holmberg, who retired, as manager of commodity sales. Geise, who will headquarter at Naugatuck, Conn., will direct a group of commodity sales managers who supervise sales, promotion, advertising and forward planning for all of the division's 300 products.

Nitrogen Div., Allied Chemical Corp. Maury W. White has been named an agricultural sales representative for Florida. White joined Nitrogen Div. last July and until this appointment was a sales trainee at the division's Hopewell, Va., office.

White

Farm Market Facts

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Doane Agricultural Research has proved valuable to many leading industrial firms. If you have a marketing or product testing problem, Phone Elmer Denis, Manager, Research Division, FOrest 1-2800, St. Louis, Missouri.

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Quebec Fertilizers Inc. Appointment of Louis-Phillipe Thibodeau as manager has been announced by Paul Bastien, president. Thibodeau is a member of the Corporation of Agronomists of Quebec and will make his headquarters at 695–25th Ave., Pointe aux Trembles, Quebec. Quebec Fertilizers Inc. is an organization "devoted to the promotion of increased farm production in the province through the scientific use of plant food." It has launched a widespread demonstration program in various sections of Quebec in cooperation with agricultural colleges and the federal and provincial departments of agriculture, working closely with local county agronomists.

Smith-Douglass Co., Inc. R. H. Farmer, vice president and general manager of Texas City Chemicals, Inc., Smith-Douglass subsidiary, has been named general manager of production for the company's Chemical Div., with headquarters in Norfolk. He will be replaced as general manager of TCC by Herman G. Powers, former assistant fertilizer division production manager.

Farmer

Powers

The Texas Co. Rudolph C. Creasy has been appointed petrochemical sales representative to users of ammonia and nitrogen solutions in Missouri, Kansas and Arkansas. His headquarters are at Texaco's central region sales office in Chicago. Before joining Texaco, Creasy sold farm chemicals for Chemagro Corp. and also supervised a fertilizer mixing plant in Missouri.

Texas Gulf Sulphur Co. Election of Hubbard S. Caven and A. Nelson Myers as vice presidents was announced recently by Fred M. Nelson, chairman.

Caven has headquarters at the company's office in Houston, Tex. Before joining the company in 1947, he was a member of the law firm of Abney and Caven.

Myers is manager of sales and operates from the New York office. He joined Texas Gulf Sulphur as assistant sales manager in 1946.

Union Carbide Chemicals Co. E. R. Marshall has been named technical manager, agricultural chemicals (International) for the Union Carbide Corp. division.

Marshall

Dr. Marshall will serve the overseas development and promotion of Union

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Carbide's line of agricultural chemicals.

United States Potash Co., Div. of U. S. Borax & Chemical Corp. L. Ralph Boynton has been appointed sales manager. Since going to U. S. Potash in 1940, Boynton has been a sales representative, Atlanta manager, Southern sales manager and assistant sales manager of the Potash Div.

United States Steel Corp. Loren R. Johnson has joined the market development staff. He will be headquartered in Pittsburgh with primary responsibilities in the Midwest states. He had been with Spencer Chemical Co. as salesman in the Indiana-Michigan area.

Chemicals

THIMET CONTROLS THRIPS, LEAFHOPPERS ON PEANUTS

Research workers at the Alabama Polytechnic Institute are enthusiastic over the control of thrips and leafhoppers on peanuts with Thimet, reports American Cyanamid Co.

Experiments with Thimet, a systemic phosphorus insecticide, have been conducted since 1955 at API under the direction of C. A. Brogden and Dr. W. G. Eden. The research workers found that the insecticide worked best by using one to two pounds of technical Thimet per acre, applied as five per cent granules (20 to 40 pounds per acre) in the furrows at planting time. The furrow treatment consistently resulted in yield increases of 200 to 500 pounds of peanuts per acre.

In tests during the past three years, excellent thrip control from planting time to about July 1 resulted from the Thimet treatment, according to Dr. Eden and Mr. Brogden.

Residue studies on peanuts treated with Thimet revealed no traces of the insecticide in the nuts after late July.

A small quantity of 5 per cent Thimet granules will be made available to peanut growers and its use supervised by the API Experiment Station.

American Cyanamid will continue to cooperate with API in its 1959 program in the various peanut counties of Alabama.

HOW DALAPON KILLS GRASS DISCOVERED BY USDA

"Discovery that the grass killer dalapon and related chemicals kill plants through vitamin starvation, and finding out just how this is done, may lead to development of more specific and better weed killers." This was reported in the March issue of "Agricultural Research," published by the U. S. Department of Agriculture. Excerpts of that report follow:

"Dalapon interferes with a plant's formation of pantothenic acid, B vitamin essential to growth and development of all organisms.

"The mechanism of dalapon's lethal action was discovered by USDA plant physiologists J. L. Hilton, W. A. Gentner and L. L. Jansen at the ARS Agricultural Research Center, Beltsville, Md., and biochemist J. S. Ard at the Eastern utilization division, Philadelphia . . .

"Normally, pantothenic acid is synthesized within a plant by enzymatic action on two known chemicals, pantoate and beta alanine. The plant enzyme has separate sites within its molecule for attaching onto each of these chemicals. The enzyme acts to bind the other two chemicals to itself, temporarily forming a single large compound. Then the enzyme withdraws from the compound, leaving the pantoate and beta alanine in chemical combination as the new vitamin.

"Dalapon and its related compounds also readily attach to the enzyme site for pantoate attachment. When this happens, the enzyme cannot combine pantoate and beta alanine and the vitamin is not synthesized . . ."

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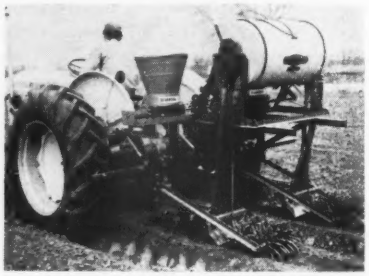

A CS-G model for chemical band treatment has been added to the Gustafson Manufacturing Co. line of Chem-Soil mixers. Developed for application of Terraclor to control Southern blight of peanuts, the equipment also may be used for dust and granular insecticides,

Calendar

April 13-17. Chemical Progress Week.

April 29-30. Manufacturing Chemists Assn. sponsors symposium on transportation, regulation and packaging of chemical products, Engineering and Scientific Center, Cleveland, Ohio.

May 6-8. American Institute of Chemists Annual Meeting, Traymore Hotel, Atlantic City, N. J.

May 18-20. Fifth National Symposium on Instrumental Methods of Analysis, Houston, Tex. Sponsored by Instrument Society of America, 313 Sixth Ave., Pittsburgh 22, Pa.

May 18-20. Chemical Specialties Manufacturers Assn. Semi-Annual Meeting, Drake Hotel, Chicago.

June 9-10. Association of Southern Feed and Fertilizer Control Officials 17th Annual Convention, Velda Rose Motel, Hot Springs, Ark.

June 11-13. Manufacturing Chemists' Association Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.

June 14-17. National Plant Food Institute Annual Convention, The Greenbrier, White Sulphur Springs, W. Va.

June 29-30. Seventh Annual California Fertilizer Conference, University of California, Davis Campus.

July 7-9. Regional Fertilizer Conference, sponsored by the Pacific Northwest Plant Food Assn. and the section's state colleges and universities, Winthrop Hotel, Tacoma, Wash.

July 29. Annual Kentucky Fertilizer Conference, Guignol Theater, University of Kentucky campus, Lexington.

Aug. 3-7. Gordon Research Conference on Biochemistry and Agriculture, Kimball Union Academy, Meridian, N. H.

herbicides and all dry fertilizer materials, according to Harvey Olander, who designed and engineered it.

The CS-G model is mounted on the tool bar of most tractors and planters together with a chemical distributor to mix and apply simultaneously with planting.

More information is available. Just

CIRCLE 136 ON SERVICE CARD

'HI-STACKER' UTILITY CAN EASES HANDLING PROBLEMS

"Hi-Stacker," a new development in utility shipping containers for liquids, is designed to ease filling, handling, storing and shipping problems, says Continental Can Co. Fitted with a reversible pouring spout that is stored inside the can during shipment, the electrically welded side-seam can is offered in 2½-, 5- and 40-pound fluid grease sizes.

Three different spouts are available: reversible utility spout with 1¾- and ¾-inch pouring openings, extended offset reversible spout with 1¼- and ¾-inch reducer cap, and a polyethylene Flex-spout.

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FINCO INC. OFFERS WAY-MATIC BAGGER

The Way-Matic bagger, for dry free-flowing materials, is now available from Finco, Inc. The bagger handles cloth, paper or multi-wall bags in sizes from 5 to 100 pounds or more at the rate of six to ten bags a minute, Finco says.

For more information

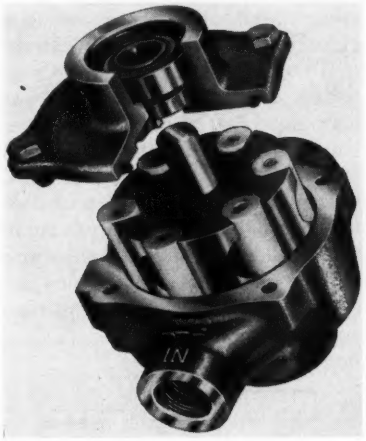
CIRCLE 138 ON SERVICE CARD

NEW SPRAYER PUMP ADDED TO HYPRO LINE

Product improvements go right along with production cost savings in the series 6600 sprayer pump introduced this season, reports Hypro Engineering. The series has sealed ball bearings, detachable mounting base and tamper-proof seal relief porting.

Offered in either cast iron or corrosion and abrasion resistant materials, the pump can be used for insecticides and herbicides. It has six nylon rollers and cartridge-type buna-N seals. Leather seals

6600 Sprayer Pump



can be substituted for use with soil fumigants and other aromatic chemicals. Optional buna-N (rubber) rollers are recommended by the manufacturer for water and liquid fertilizers.

For a descriptive brochure,

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STEREO-MICROSCOPE

Edmund Scientific Co. is now making an industrial stereo-microscope with low power attachment for use in quality control, production line inspection, research work and small parts assembly.

Because it provides three-dimensional vision, the stereo-microscope permits detection of flaws in materials, reveals depth of depressions in surfaces and makes it far easier to interpret images under magnification.

Additional eye pieces and low power adjustment give a power of 6, 10, 23 and 40. For details

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PATENT REVIEWS

By Dr. Melvin Nord

Granular Fertilizers From Phosphate Rock

U. S. 2,859,105, issued Nov. 4, 1958 to Jean Moyrand and Bernard Bigot, assigned to Societe Anonyme des Manufactures des Glaces et Produits Chemiques de Saint-Gobain, describes a process for preparing granular fertilizers from phosphate rock.

An example of the method is shown in Fig. 1. Nitric acid was used to attack natural phosphate at a rate which produced a phospho-nitrate sludge at a rate of eight metric tons per hour. This sludge was ammoniated after it had been stripped of calcium nitrate; removal was accomplished by filtering off a part of the salt and adding phosphoric acid to change the form of the remainder. The sludge required about one per cent of its weight of ammoniacal nitrogen to be brought to its final condition for use in the present invention. The sludge obtained titrated 15 per cent P_2O_5, 6.5 per cent nitric acid, 5.5 per cent ammoniacal nitrogen, and 28 per cent water. Its temperature was 105 degrees C. This sludge was poured into a vat 1, provided with an agitator, through a conduit 2. At the same time, 5 tons per hour of oversized product were discharged from the end of the process and added to the vat through a conduit 3. This recycled product was still hot from the dryer. Through a submerged inlet 4, 100 kilograms per hour of gaseous ammonia were admitted to the vat. The ammoniation was exothermic and contributed to compensate for the chilling effect of the dissolving oversized granules. Thus, the temperature remained constant while the dimensions of the oversized particles were reduced by the dissolving of the outer parts of the granules. In the present case, it was desired to produce granules with a maximum dimension of 4 millimeters, and this was accomplished with the rates of addition specified. The material was not totally dissolved. It was also desired that the particle size should not be less than 2 millimeters and the process of size reduction generally stopped above that limit.

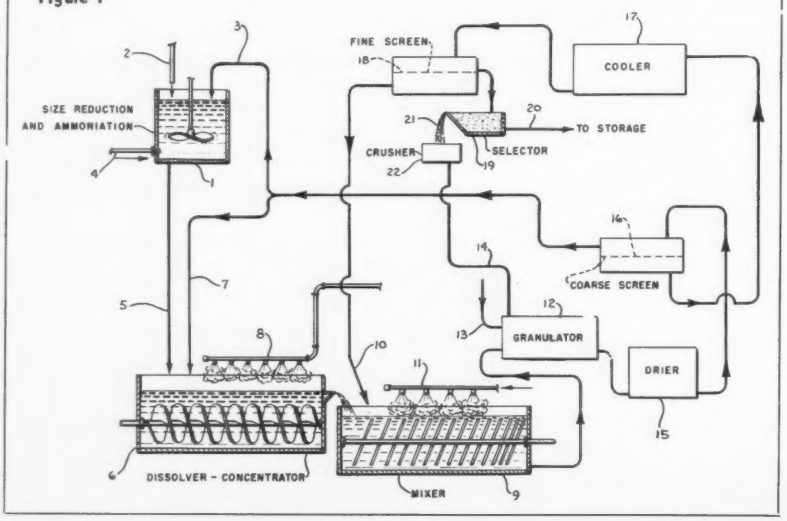
The sludge thus formed was discharged at about 8 tons per hour, to one end of a long tank 6 provided with a worm-type conveyor, which performed a double function of securing good mixing of the ingredients and of constantly moving the mass toward the discharge end. The concentrator-dissolver 6 had a capacity of about 1.5 cubic meters and it received in addition to the discharge from vat 1 about 5 tons per hour of the oversized, re-cycled granules, while still hot, from the dryer. In this apparatus the temperature was maintained constant at about 90°, a blast of hot air being admitted to the top of the mass through a pipe 8; the air was at about 250° C.

The sludge issuing from the concentrator-dissolver by overflow was admitted to a mixer 9 where it was mixed with about 10 tons per hour of fines of dimensions less than 2 millimeters arriving by a conduit 10.

The fines were introduced, recycled, at a temperature of about 30° C. and no other cooling was generally necessary to assure the crystallization of the sludge in the mixer. The paste thus formed was then introduced into a granulator 12. There was also admitted to this granulator through the conduit 13 about four tons per hour of potassium chloride titrating about 52 per cent K_2O, thus making the finished product a ternary fertilizer. A surplus of finely divided finished product was admitted to this granulator through pipe 14 after preliminary crushing in crusher 22 to the size of fines.

From the granulator 12, the product went to a dryer 15 and from the dryer to a coarse screen 16. The screen retained particles larger than 4 millimeters in size, and passed those of smaller dimensions to cooler 17, from which they went to a second screen 18 which passed particles smaller than 2 millimeters and retained those above that size. The oversized particles from screen 16 were recycled through conduits 3 and 7. The fines which passed screen 18 were sent to the head end of the mixer 9. The medium sized particles from screen 18 were sent to a uniform-discharge device 19, which directed finished product to storage at a uniform rate. The surplus from this rate of discharge to storage was sent to a crusher 22 where it was reduced to a state of fines and these were added through conduit 14 to the granulator 12. ▲

Figure 1



Developments in Superphosphate Production

The manufacture of superphosphate, one of the oldest and most important operations in the fertilizer industry, has undergone important changes and developments in the past decade. The purpose of this paper is to review these developments and to evaluate the current status of superphosphate production technology.

There are several good basic reviews on superphosphate in the fertilizer literature. Among the latest are those by Waggaman (*36*), Siems (*33*), and Jacob (*19*). Since these include accounts of the history of the industry and good descriptions of the basic practice, the present review is restricted mainly to recent innovations and to the current status.

By A. V. SLACK*

In this issue, the author discusses developments in the manufacture of ordinary superphosphate. Next month this unique study will be concluded with discussions of developments in the manufacture of enriched superphosphate, triple superphosphate and highly concentrated superphosphate.

PRINCIPAL STEPS INVOLVED in making ordinary superphosphate are 1) mixing the rock and acid, 2) denning for a time sufficient to allow the mix to set up to a solid form and 3) storage for a time sufficient to allow the acidulation reaction to go to completion. There have been developments in all of these steps in the past few years.

MIXING

The standard mixer for many years has been the covered pan type, equipped with vertical revolving stirrers. It is operated in a batch-wise manner and is normally used in conjunction with batch-type dens. In continuous processes, such as the Broadfield and the Sackett, mixing as well as denning is carried out in a continuous manner. A pugmill mixer is used in the Broadfield process and a combination of spray tower and pugmill in the Sackett type.

The developmental trend in recent years has been toward simpler and less expensive mixing equipment. In Europe, the Kuhlmann Company has developed a mixing process (*13*) which involves use of a turbine-type agitator in a very small mixing vessel. Streams of phosphate rock dust and acid are fed continuously into this mixer. The resulting slurry is said to be emulsified by introduction of air from the action of the agitator. Some of the advantages claimed are that the mixer is small and relatively inexpensive, foundations for the unit do not need to be heavy and labor and power requirements are low.

In this country, the trend to mixer simplification is exemplified by the cone mixer (*38*) now used in many plants. In plants using the cone mixer, the phosphate rock normally is fed by a gravimetric type of feeder. The rock dust enters the mixer through the central feed pipe and impinges on the inverted cone, the purpose of which is to give good distribution of the dust. The acid enters through several tubes set close to the cone wall; these are set at an angle to give a tangential flow to the acid. In some plants, water for acid dilution is added through one or more nozzles.

A major advantage of the cone mixer is that no moving parts are involved and therefore no power is required. Other advantages are low space requirement and low maintenance cost. A 40-ton-per-hour production rate can be attained in a mixer 24 inches in diameter and about 24 inches high, with a reported maintenance cost of only 1 to 2 cents per ton. However, the advantage which probably has figured most heavily in adoption of the mixer by industry is the low investment cost. The cost of a cone mixer installation is much less than that for an equivalent installation with a standard pan mixer. Part of the lower cost is due to the reduced structural support requirements and lower installation cost.

Much of the recent developmental work on the cone mixer has been done by producers and engineering firms in connection with plant installations. Jackson (*17, 18*) has described several of these. One of the early drawbacks was that the cone had to be operated at close to capacity because lower rates caused poor mixing. A recent development now makes it possible

Tennessee Valley Authority, Wilson Dam, Ala.

to get good mixing at a rate as low as 50 per cent of capacity.

The practice of adding dilution water in the cone eliminates the need for separate dilution and cooling equipment but also introduces problems, especially when 93 to 98 per cent acid is used. The steam evolved tends to obscure the view of the operator and uniform operating results are more difficult to obtain.

Cones are made of various materials, including stainless steel, cast iron and black iron. In some plants a removable liner is used to prolong the life of the cone. A 10-gauge black iron liner often lasts for production of 30,000 to 50,000 tons of product if care is taken to avoid acid drip during starting and stopping.

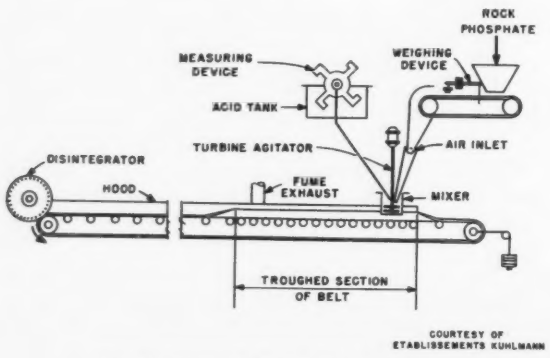
The cone mixer, unlike some other mixers, is used with various dens, including the box type, Sturtevant and Broadfield. There are now about 30 cone installations in this country.

Very little information appears to be available on the relative efficiency of the various types of mixers. According to Siems (*33*), the relatively long retention time in the pugmill type gives intimate mixing and a final product which is denser and more granular than superphosphate made with other types of mixers. It is claimed that the aeration produced by the turbine agitator in the Kuhlmann mixer gives a cooling effect and that this increases the rate of curing. The cone mixer, which does less stirring and agitation of the mix than any of the mixers, is said to produce a superphosphate of small particle size that is relatively easy to ammoniate but which tends to be dusty.

DENNING

The principal differences in superphosphate production technology are found in the denning steps. In fact, the processes are usually named for the type of den used. Most of the dens are still of the batch type, but the developmental trend is to continuous operation in order to reduce labor requirements.

Batch Dens The stationary box or silo den, excavated by hand, by dragline or by crane, is the oldest type and is still used in many plants. The Sturtevant den is also widely used and is the type usually selected for new batch installations. It is simple, relatively low in maintenance requirements and handles fumes much better than the box type.



Use of conveyor belt as a den in producing ordinary superphosphate

The box dens and Sturtevants make up the bulk of the batch dens in this country. There are also a few of the Svenska type, and in Europe the Wenk, Milch, Moritz, Höfferman, Beskow, and Bruhn and Keller are used. Design and operation of many of these is described by Siems (*33*), Waggaman (*36*) and Parrish and Ogilvie (*24*).

The Oberphos process, once used in this country, was a batch process aimed at obtaining a superphosphate of superior physical condition. Rock and acid were introduced into an autoclave, where mixing and reaction took place at a temperature of about 300°F. and a pressure of 90 p.s.i. Good physical condition and some granulation was obtained but the production rate was quite low for the investment involved. The process has been generally abandoned; only one plant, in Canada, is known to be in operation.

Continuous Processes There are several types of continuous dens; most of them involve the use of a continuous conveyor of some sort to carry the superphosphate from the mixing point to the cutter, with sufficient time between to allow the superphosphate to set up. The Broadfield, Sackett and Forbis dens are the principal ones used in this country. In Europe the Maxwell, Moritz-Standaert, Nordengren, Kuhlmann, Montecatini, St. Gobain and Rumianca are used, and there are also several Broadfield units. Of these the Maxwell and Moritz-Standaert are annular dens which turn continuously, the superphosphate setting up during the single revolution. All the others use conveyors of various types.

The Broadfield den has a continuous slat-type conveyor. The walls are separate from the conveyor and may or may not move with the conveyor. In the Sackett den (*12*) the superphosphate is carried on a channel-like conveyor made up of U-shaped plates, so that in effect the conveyor carries its own side walls with it. The Forbis den is a circular one, with the superphosphate carried in the annular space between two circular walls mounted on a turntable.

In the Kuhlmann process the den design is simplified considerably by use of a long conveyor belt. The belt is troughed for some distance past the mixing point to hold the slurry during the setting up period. Thereafter the belt is flat.

Equipment used in Russia for superphosphate production has been described by Tsyrlin (*34*). The continuous den described is a circular one, very much like the Moritz-Standaert type. The den is made of ferroconcrete and revolves around a vertical axis once in 2.5 hours. A stationary cast iron partition, suspended from the den cover, separates the slurry inlet from the cutting zone.

One of the newer developments in den design is use of a rotary drum. Work on this has been carried out by Montecatini and St. Gobain on the European continent, by Hy. Richardson and Company in England and by TVA in this country (*26*).

The English work has been described by J. T. Procter (*28*). The basic principle of the process is

that the superphosphate is kept in a state of slow shearing movement throughout the setting up period. Thus it passes continuously from the slurry to solid form, obviating any need for the usual cutting mechanism. One of the main advantages is that gas evolution is promoted and a relatively dry product is therefore produced.

St. Gobain (France) and Montecatini (Italy) have several rotary drum dens in operation (*31*). Although separate mixers are used with many of these, introduction of acid and phosphate rock separately into the drum is also practiced. Good mixing is reported.

Status of Den Types Continuous dens appear to have been taken up more abroad than they have in this country. For example, Tsyrlin (*34*) states that in 1954, 24 per cent of Russian superphosphate was produced by continuous processes and that the percentage was increasing. This is a considerably higher proportion than in the U. S. Parrish and Ogilvie (*24*) report that the Broadfield den, developed in this country, is used to a much greater extent in England and on the continent.

An approximate division of plants in this country between various den types is given in the following tabulation.

Den type	Number of plants
Batch	
Nonmechanical[a]	74
Sturtevant	104
Svenska	5
Continuous	
Broadfield	24
Sackett	3
Forbis	3

[a] Box, silo, or pit.

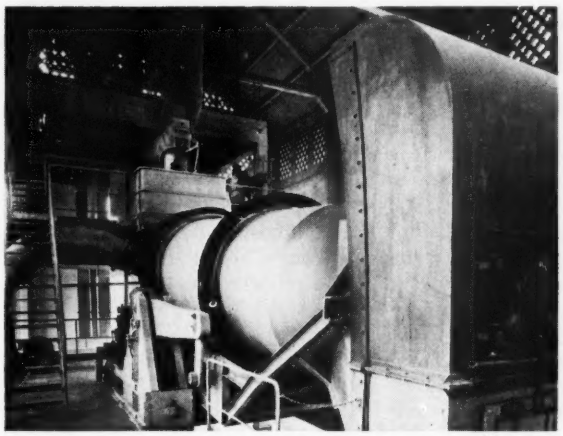
Comparison of these figures with those reported by Jacob (*19*) in 1950 shows a significant increase in the number of mechanical dens, both continuous and batch, and a corresponding decrease in the number of nonmechanical dens.

No attempt has been made to assess the relative status of the older den types in other countries. Of the newer types, the Kuhlmann process is used in 20 to 25 plants, mainly in Europe and South America. There have been 21 installations of rotary drum dens reported. Most of them are in Italy and France, but there are plants in England, Spain, and the Philippines.

CURING

The principal developments in regard to curing of ordinary superphosphate have been concerned with elimination of the need for a long curing period. This has the advantage of reducing investment for storage and inventory, and may also allow production of a multicomponent fertilizer in one operation.

"Quick curing" is the term often used to describe such processes. The term is a relative one and somewhat difficult to define. The ideal quick-curing process is one which would give a product suitable for immediate bagging and shipment (or use in ammoniation) and with as high a degree of phosphate availability



Montecatini

Rotary drum den for normal superphosphate

as that obtained in normal storage curing. However, something less than these requirements might be acceptable For example, a lower phosphate availability might be tolerated to get the advantage of lower storage investment. Moreover, there is normally some delay between production of the superphosphate and its use that would allow further conversion to take place. Thus 95 per cent conversion in 24 hours might be a reasonable requirement for a quick-curing process.

Most of the quick-curing processes have involved a heating step. Heating of superphosphate from the den has also been done, mainly in Europe, when the primary objective was drying or granulation rather than quick curing. In these instances some acceleration of curing may have been attained but the degree of improvement is not clear from published accounts.

Extensive work on quick curing involving drying has been done by Bridger and coworkers at Iowa State College (*4, 6, 7*). They found that conversion was promoted by using a lower strength acid than usual and by limiting the degree of drying. From pilot-plant results it was concluded that superphosphate with good handling qualities, suitable for immediate use in direct application, could be made by drying to a low moisture content if some reduction in conversion were acceptable as compared to storage-cured superphosphate. Drying to an intermediate moisture content and storing for 2 or 3 days appeared to be a better course for superphosphate produced for use in mixed goods. The quick-cured superphosphate was found to be more deleterious to bags than the storage-cured type.

This indicates the difficulty in getting high conversion when a drying step is included in the process, as it must be when dilute acid is used to promote quick curing or when water is added to promote granulation. The heat should promote conversion as long as there is sufficient moisture present to give mobility to the free acid in the mix. However, the moisture is removed by the heat, and after a certain moisture level is reached not only is further conversion during the heating period stopped but subsequent conversion is also retarded. Bridger et al. found

that superphosphate dried to 11 per cent moisture increased from 90 to about 98 per cent conversion in 2 days whereas samples dried to 4 per cent or less increased very little if at all.

Procter, of Hy. Richardson and Company (England) (*29*), has described a process in which production of superphosphate is combined with granulation of mixed fertilizer. Two-stage acidulation is used and ammonium and potash salts are added during the second acidulation step. The mixture passes through a granulating drum and then through a dryer and cooler. Conversion was reported to be over 96 per cent in 24 hours for Gafsa and Morocco rock. It was found desirable to avoid drying below 4 per cent moisture in order to get good conversion.

Rounsley and Boylan (*30*) have investigated a quick-curing process involving grinding the rock-acid mix during both the acidulation and drying steps. Good conversion was obtained within an hour. The grinding appeared to be quite beneficial in removing films of reaction products from the unreacted rock surfaces. The process was demonstrated on a pilot-plant scale.

Young and Heil (*39*) have reported work at TVA on a quick-curing process which does not involve a drying or heating step. The objective in this work was to produce superphosphate suitable for immediate use in ammoniation and granulation rather than for shipment. Therefore, excess acid and high moisture content could be tolerated. By using finer rock, more dilute acid and a higher acid-rock ratio than is normally used, 95 per cent conversion was obtained in 1 hour in pilot-plant tests. The product was used directly from the den in making granular mixed fertilizer.

The position of quick curing in superphosphate technology is difficult to evaluate. Many producers feel that the usual curing period gives the advantage of providing buffer or surge capacity between the production of superphosphate and mixed goods. Because of this they can better handle raw material supply problems and also the problems connected with the seasonal nature of the industry. Others, however, consider that eliminating the need for curing facilities is a more important advantage. The fact that few ordinary superphosphate plants are being built is a factor that is unfavorable to rapid acceptance of quick-curing procedures.

PROCESS VARIATIONS

Several variations from the standard superphosphate process have been proposed in recent years and some have been put into use. These have been concerned mainly with improving the quality of the product or reducing cost.

Two-Step Acidulation The two-step approach was proposed originally by Nordengren (*23*). The acid is reacted with part of the rock in the first mixer and the remainder of the rock is added to the second mixer. Advantages claimed are that the reaction is faster and that stronger acid can be used, thus giving a drier product. Lehrecke (*22*) gave results from plant-scale tests in Sweden of this process and stated that no difficulty was encountered in using acid as high as 60° Be (78 per cent).

Chepelevetskii et al. (*9*) proposed several other two-step combinations for the same purpose. One of these was to use a fairly dilute acid in the first step and a very concentrated one in the second. Rock was added in both steps in the usual ratio. A drier product was obtained because the average concentration of the acid in the two steps was higher than that used in the standard one-step method. This process was put into successful operation in the superphosphate plant of the Voskresenskii Chemical Combine (USSR).

Reduction in Acid Requirement Many workers have tried to find a way to reduce the acid requirement in superphosphate manufacture. If the acid would react to give dicalcium phosphate rather than monocalcium phosphate the amount of acid required would be only about one half as much. However, when rock is reacted with a deficiency of acid, part of the rock is converted to monocalcium phosphate as usual and the remainder is not affected.

One of the most recent efforts to reduce the amount of acid was by Bridger et al. (*5*), who reported work on a process in which rock is treated with a deficiency of acid at atmospheric pressure. The acidulate is heated under reflux to convert the monocalcium phosphate formed to a mixture of dicalcium phosphate and phosphoric acid. The unreacted rock is then solubilized by heating without reflux to promote reaction of the rock with the phosphoric acid formed in the first heating step. Conversions as high as 97 to 98 per cent were obtained.

Products from such processes are very good for direct application but are at a disadvantage in mixed fertilizer production because they do not ammoniate very well. Actually, modern ammoniation practice in effect accomplishes acidulation of the rock with only the amount of acid needed to make dicalcium phosphate. This is because ammoniation converts superphosphate, which is a mixture of monocalcium phosphate and calcium sulfate, into dicalcium phosphate (or more basic forms of phosphate) and ammonium sulfate. Thus the extra acid over and above that required to form dicalcium phosphate ends up by performing a second function of making ammonium sulfate. This is a worth-while function in itself and therefore the excess acid should not be charged to the rock acidulation step.

Serpentine Superphosphate During World War II a product known as serpentine superphosphate became quite popular in Australia and New Zealand. The material is made by mixing serpentine, a magnesium ore, with superphosphate to give a product containing about 15 per cent P_2O_5, of which about one-third is water soluble. It has been reported that the product is as effective pound for pound as superphosphate. The principal advantage during the war was that it extended the short supply of phosphate rock. Moreover, it neutralized free acid and thereby improved condition of the superphosphate.

It is reported that considerable quantities of ser-

pentine phosphate are still used in New Zealand and Australia. However, the tonnage appears to be much less than it was during the war.

Use of Surfactants In this country one of the most publicized developments in superphosphate manufacture has been the use of surface-active agents. Advantages claimed for the addition have been faster reaction, better condition of product, and making feasible the use of stronger acid.

The development has been fraught with considerable disagreement as to the degree of benefit gained by use of surfactants. Sauchelli (*32*) in 1953 reported the views of several producers. These varied all the way from major benefit to no benefit at all. This might be expected since operating conditions probably differed considerably between the various plants. In laboratory work reported later by Fox et al. (*14*), it was concluded that there was no significant effect of surfactant on reaction rate in the first day of curing. Results from longer curing periods were not reported. In work done by Arvan et al. (*2*), the same general result was found for the first day of curing. However, after 3 or 4 days most tests showed an advantage of 1 to 2 per cent in conversion for the surfactants. Fox et al. (*15*) also described a plant-scale test in which 225- to 450-ton lots were made for comparison. After storage for 22 days the lot treated with nonionic surfactant had 3 per cent better conversion.

Improvement in condition of the product is regarded by many as the most important advantage from use of surfactants. Kumagai and Hardesty (*21*), in small-scale tests, found that the nonionic type decreased product density, decreased cake strength and increased ammonia absorption capacity. However, in the plant test by Fox no decrease in cake strength in the curing pile was noted.

The nonionic type of surfactant appears superior to the anionic. All the above workers found some disadvantage for the anionic.

The present status of surfactant use is not very clear. The general consensus seems to be that if a plant is not getting good physical condition or needs a softer superphosphate, a surfactant will help. However, many get good condition and conversion without surfactant and consider that the extra expense is not justified. Among nine producers selected at random, two stated that they used a surfactant and considered it helpful; the others had tried surfactants and did not consider the expense justified.

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PEST REPORTS

*By Kelvin Dorward**

Although ***spotted alfalfa aphid*** populations have not been high during the winter, the distribution has been interesting. The insect was found as far north as Halifax County, Virginia, during late January. Populations during the 1958 growing season were relatively light in the state. The spotted alfalfa aphid was also active throughout the winter in Kansas. During the last day of January high counts per 25 plants were given for the following Kansas counties: Riley 18, Geary 103, Marion 52, Butler 315 and Cowley 834. In addition, light populations were also recorded during February in Barton, Pawnee and Hodgeman Counties.

Populations were light in Oklahoma with 75 per square foot being recorded in 4-5 inch alfalfa in Bryan County. Some alfalfa fields in Payne County had an average population of 504 per square foot.

Several heavy infestations of the spotted alfalfa aphid were found on nonresistant varieties of alfalfa in Eddy and Lea Counties, New Mexico. Light to moderate infestations were recorded in southern and southeastern counties. Some control measures were applied.

The ***pea aphid,*** by the latter part of February, was building up in several states. Infestations on alfalfa were medium but increasing in Yuma, Maricopa and Pinal Counties, Arizona. Populations were heavy and injuring alfalfa in areas of Eddy, Chaves, De Baca and Dona Ana Counties, New Mexico. Some growers were applying controls. Light populations were recorded during February in Arkansas and Kansas.

By the latter part of February, the ***winter grain mite*** was being reported. Heavy damage to oats was caused by the mite in Dallas County, Texas. Scattered populations averaged 25 mites per linear foot in small grain fields in Bryan County, Oklahoma. One field in the Enid area, however, averaged over 200 per linear foot.

The ***greenbug*** was light in all states reporting on the pest, except Texas, where slight damage was recorded in fields of Dallas County. The insect was not found in six Kansas counties surveyed during the latter part of February.

A limited ***grasshopper*** egg survey in 12 Texas panhandle counties showed egg pods to be in good condition with predators and natural enemies few.

The ***vegetable weevil*** was heavy on turnips in East Baton Rouge Parish, Louisiana, in late February. The insect attacked newly set lettuce in New Hanover County, North Carolina, early in the month.

The ***green peach aphid*** required controls in all sugar beet fields grown for seed in the Salt River Valley of Arizona.

In southern California the ***strawberry aphid*** built up to damaging numbers as a result of warm weather and little rain. In that state the seed-corn maggot damaged spinach in Orange County. Spinach was also damaged in Zavala and Dimmit Counties, Texas, by the same insect. Controls were applied in the Texas counties as a preventive measure.

The ***tobacco flea beetle*** and the vegetable weevil were present in light to moderate numbers on tobacco in several Georgia counties. The ***potato tuberworm*** and ***yellow-striped armyworm*** were on tobacco plants in West Palm Beach County, Florida.

Although fruit insect activity during February was light, a check in Bernalillo and Sandoval Counties, New Mexico, showed overwintering larvae of the ***codling moth*** to be abundant under the bark of apple trees.

Among insects affecting man, ***mosquitoes*** were very prominent in Florida. In January mosquito populations increased in Brevard County and peak populations continued in the Indian River area. Of unusual interest was the report during February of the ***tropical rat mite*** causing dermatitis to some humans in some rural areas of Tillman County, Oklahoma.

*Chief Staff Officer, Survey & Detection Operations, Plant Pest Control Div., Agricultural Research Service, USDA.

INSECT DETECTION EFFORTS TO BE STEPPED-UP

Within the past several years various agricultural agencies have gone on record requesting increased emphasis on plant pest detection. The increased interest in this phase of plant pest control has undoubtedly been stimulated by recent successes in some of the large scale eradication programs such as the Mediterranean fruit fly in Florida.

The agencies asked for a cooperative detection program coordinated and directed at the national level. The Plant Pest Control Division, also recognizing the great need for this work, has acknowledged the requests by establishing a position within its Survey and Detection Operations devoted to detection of insects not known to occur in the United States and to detection of economically important insects not known to occur in certain areas of the United States. E. D. Burgess, director of the division, recently announced the initiation of this program.

In keeping with the discussion here on detection, it will be of interest to review the new records reported during the past year. In 1958 there were 30 new state records reported involving 28 species of insects and mites.

Some of the more important new finds were the alfalfa weevil in Georgia and Rhode Island, spotted alfalfa aphid in Washington and Oregon, smaller European elm bark beetle in Nevada, black pecan aphid and spruce bud scale in California, clover seed weevil in Illinois and Utah, birch leaf miner in Indiana, mimosa webworm in Florida, and rice delphacid, vector of hoja blanca disease of rice, in Mississippi.

Many of the species involved in the spread to new areas in 1958 were pests that have been introduced into the country over the years. ▲

Alphabetical List of Advertisers

American Agricultural Chemical Co., New York City..... 9
American Cyanamid Co., New York City.....2, 3, 43
Armour Fertilizer Works, Atlanta, Ga..... —
Ashcraft-Wilkinson Co., Atlanta, Ga.....27, 52
Baughman Mfg. Co., Jerseyville, Ill..... 53
Bradley & Baker, New York City..... —
Chase Bag Co., Chicago, Ill..... 5
Clark Equipt. Co., Benton Harbor, Mich..... 39
Clover Chemical Co., Pittsburgh, Pa..... —
Commercial Solvents Corporation, New York City..... —
DeBardeleben Marine Corp., New Orleans, La..... 67
Doane Agricultural Service, Inc., St. Louis, Mo..... 55
Duval Sulphur & Potash Co., Houston, Tex..... 27
E. I. du Pont de Nemours & Co., Inc., Wilmington, Del..... —
Emulsol Chemical Corp., Chicago, Ill..... —
Dave Fischbein Co., Minneapolis, Minn..... —
Flexo Products Inc., Westlake, Ohio..... —
Geigy Agricultural Chemicals, New York City..... —
Glenn Chemical Co., Inc., Chicago, Ill..... —
W. R. Grace & Co., Davison Chemical Div., Baltimore, Md. 11
Grand River Chem. Div., Deere & Co., Tulsa, Okla..... 24
Hanson Equipment Co., Beloit, Wis..... —
Highway Equipment Co., Cedar Rapids, Iowa..... 49
Hough, The Frank G. Co., Libertyville, Ill.....Back Cover
Hudson Pulp and Paper Corp., New York City...Second Cover
International Minerals & Chemical Corp., Skokie, Ill...21, 33–36
International Paper Co., New York City..... —
Johns-Manville Corp., New York City..... —
Kalo Inoculant Co., Quincy, Ill..... 54
Kraft Bag Corporation, New York City..... —
Monarch Mfg. Works, Inc., Philadelphia, Pa..... 59
Monsanto Chemical Co., St. Louis, Mo..... —
Penola Oil Co., New York City..... 7
Phillips Chemical Co., Bartlesville, Okla..... 1
Potash Co. of America, Washington, D. C.....Third Cover
Poulsen Co., Los Angeles, Calif..... —
Raymond Bag Corp., Middletown, Ohio..... —
Reade Mfg. Co., Inc., Jersey City, N. J..... 59
Republic Chemical Corp., New York City..... —
Schmutz Mfg. Co., Louisville, Ky..... 56
Shuey & Company, Inc., Savannah, Ga..... 59
Sinclair Chemicals, Inc., Chicago, Ill..... —
Sohio Chemical Co., Lima, Ohio..... —
Spraying Systems Co., Bellwood, Ill..... 57
Stedman Foundry and Machine Co., Inc., Aurora, Ind..... 57
Swift & Co., Chicago, Ill..... 19
Tennessee Corporation, Atlanta, Ga..... 31
The Texas Company, New York City..... 15
Texas Gulf Sulphur Co., New York City..... 67
Thomas Alabama Kaolin Co., Baltimore, Md..... 26
Tractomotive Corp., Deerfield, Ill..... —
Union Bag-Camp Paper Corp., New York City..... —
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla..... —
Vulcan Containers, Inc., Bellwood, Ill..... —
West Virginia Pulp and Paper Co., New York City.....12, 13
Woodward & Dickerson, Inc., Philadelphia, Pa..... 51
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EDITORIAL

The foundation is there —let's start building!

Last month, we discussed the need for better tonnage reporting—suggesting that the industry take a look at the many uses which the extension service makes of county-by-county data.

The extension service has been extremely helpful in getting improved fertilizer laws established in many states. But, unfortunately, *no government agency is any more effective than the public permits it to be.*

Several days after writing that editorial, a copy of Jesse W. Markham's new book, "The Fertilizer Industry," came across this desk. It is described as a "Study of an Imperfect Market." Actually, little attention is given to the major marketing problems, but it should be recognized as a well-written study and is well worth the price of $6. (Vanderbilt University Press, Nashville, Tenn.)

Although the author is no less critical of the extension service than he is of the fertilizer industry, some of his remarks bear out the thoughts expressed on this page last month.

Reducing the "social" cost of unintelligent buying of fertilizer by farmers, Markham points out, can be accomplished by:

1) Better coordination of existing fertilizer programs. (Referring, of course, to government programs like Extension, ACP, TVA etc—Ed.)

2) Improved extension services.

3) More up-to-date state control laws.

Now here are the glaring weaknesses of his "study of an imperfect market":

▶ *He overemphasizes the importance of government programs in strengthening the market. It's time that the industry itself assumes more and more of the functions of education through service.*

▶ The entire book is devoted to "imperfect buyer knowledge and irrational choice" plus sections devoted to "collusive agreements." There are only occasional references to the major *demand-side* problems of the market.

▶ Markham presents nothing new in his criticisms of inadequate knowledge of what makes a farmer act the way he does. *The NPFI has uncovered a wealth of material on this subject.* In fact, the state colleges preceded the survey, "Farmer Attitudes Toward the Use of Fertilizer," with valuable socio-economic studies of their own.

▶ Markham's knowledge of the *ideal relationship* between the farmer and county agent seems to be woefully limited. The county agent has been maligned by minority groups such as organic gardening enthusiastics and others as a "commercial fertilizer man." The urban county agent has been criticized by ladies' garden clubs for spending too much time with nurserymen, golf course superintendents and others who call on him to solve their pesticide and fertilizer problems.

Considering the demands and restrictions which the public has placed on him, we think he's done a marvelous job in maintaining his role as *the farmer's only true adviser, confidante and friend* through thick and thin.

This role is invaluable to the farm chemicals industry and must not be altered!

Industry malpractices affect the county agent's effectiveness in persuading farmers to use more high analysis fertilizer, weed killers and other chemicals. Here are just a few thorns in his path:

1) Lack of proper industry promotion (ill-advised product claims etc.), 2) Poor pricing policies, 3) Lack of company service, 4) Poor public relations.

The way Markham writes you'd think he's trying to give the impression that the county agent has a half nelson on the industry. *Actually, the main problem in 1959 is not to increase the overall volume of more than 22 million tons, but to realize a respectable return on the 22 million tons!*

A leading *fertilizer* marketing authority told FARM CHEMICALS recently: "22 million tons is an adequate volume for everybody to enjoy. If we would just improve the merchandising practices so that the profit margins can be increased—by let's say, $2—we would have $44 million to divide up that we didn't have yesterday."

One marketing factor that could be curtailed by *better tonnage reporting* was brought out by Markham in his book:

"The amount of price-cutting in a season depends largely on how accurately fertilizer producers have forecast the market."

Price-cutting is the result of imperfect knowledge, we'll agree. However, the industry cannot rely on Government agencies to upgrade its market—*a better informed* market than Mr. Markham gives Extension credit for, by the way!

The fact that the industry is slowly beginning to realize is this: upon the broad education foundation built by the county agent and other educational agencies, a *marketing structure* must be built.

GORDON L. BERG

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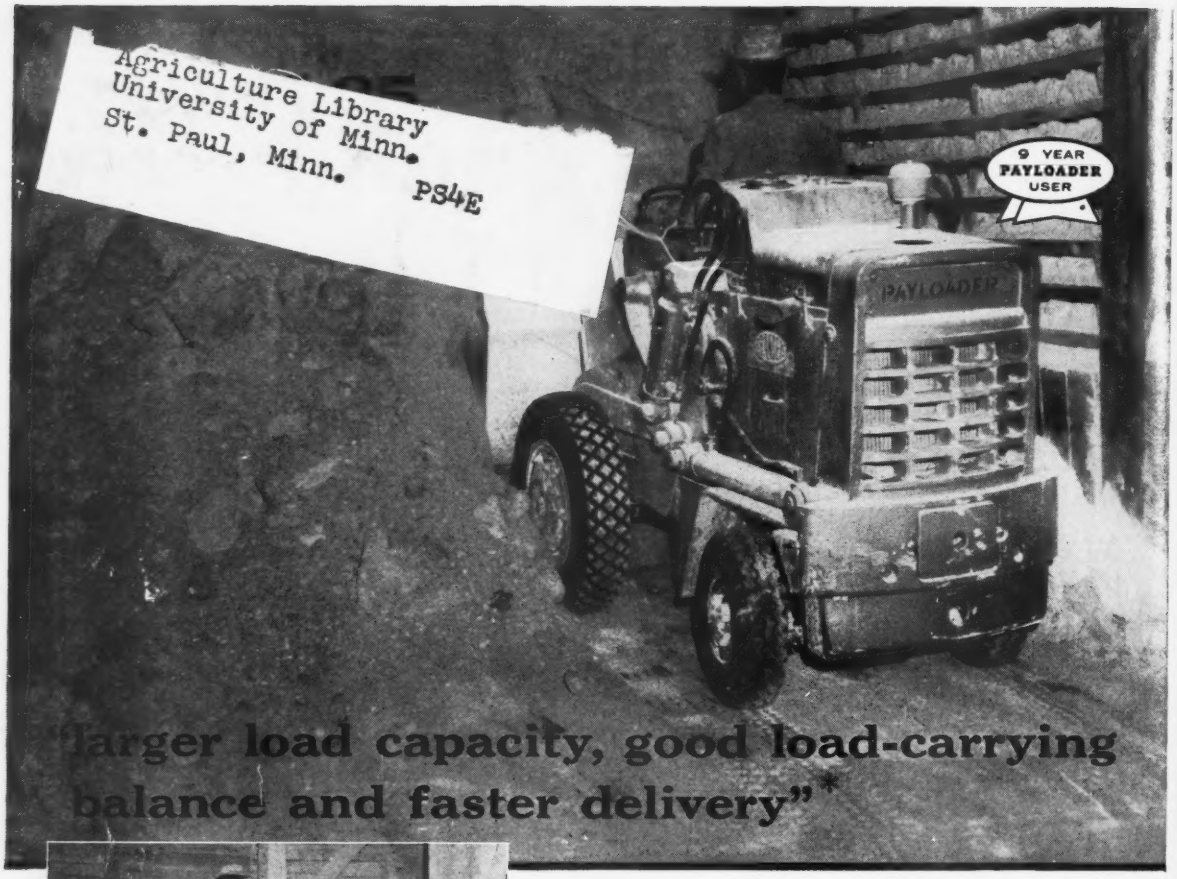

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